

**Final  
Total Maximum Daily Load for E. coli  
22 Stream Segments within the Beaver Creek Watershed  
Floyd and Knott Counties, Kentucky  
September, 2010**

**Submitted to:  
United States Environmental Protection Agency  
Region IV  
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**Kentucky Department for Environmental Protection  
Division of Water**

This report is approved for release

  
Sandra L. Gruzesky, P.E., Director  
Division of Water

9/10/10  
Date



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## Glossary of Acronyms

ADD	Area Development District
AFO	Animal Feeding Operation
AWQA	Agriculture Water Quality Act
BMP	Best Management Practices
CAFO	Confined Animal Feeding Operation
CFR	Code of Federal Regulations
CPP	Continuing Planning Process
CSO	Combined Sewer Overflow
DMR	Discharge Monitoring Report
GNIS	Geographic Names Information System
HUC	Hydrologic Unit Code
KAR	Kentucky Administrative Regulations
KDOW	Kentucky Division of Water
KGS	Kentucky Geological Survey
KRS	Kentucky Revised Statutes
KIA	Kentucky Infrastructure Authority
KNDOP	Kentucky No Discharge Operating Permit
KPDES	Kentucky Pollution Discharge Elimination System
LA	Load Allocations
LTCP	Long Term Control Plan
MAF	Mean Annual Flow
MGD	Million Gallons per Day
MOS	Margin of Safety
MS4	Municipal Separate Storm Sewer Systems
NASS	National Agricultural Statistics Service
NLCD	National Land Cover Database
NRCS	Natural Resources Conservation Service
OSTDS	On Site Sewage Treatment and Disposal System
PCR	Primary Contact Recreation
POTW	Publicly Owned Treatment Works
RM	River Mile
SCR	Secondary Contact Recreation
SOP	Standard Operating Procedures
STP	Sewage Treatment Plant
TMDL	Total Maximum Daily Load
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WBID	Waterbody Identification Number
WLA	Waste Load Allocation
WQC	Water Quality Criteria
WQS	Water Quality Standard
WWTP	Wastewater Treatment Plant

## Total Maximum Daily Load Synopsis

**State:** Kentucky

**Major River Basin:** Big Sandy

**USGS HUC8:** 05070203

**Counties:** Floyd and Knott

**Impaired Use(s):** Primary and Secondary Contact Recreation

**Pollutants of Concern:** Fecal Coliform, E. coli

The Beaver Creek Watershed is located in the Big Sandy River Basin in Floyd and Knott Counties and encompasses the cities of Wheelwright and Pippa Passes in its headwaters, Wayland in its midst, and Martin and Allen near its confluence with Levisa Fork. A map depicting the location of the Beaver Creek Watershed is in Figure S.1.

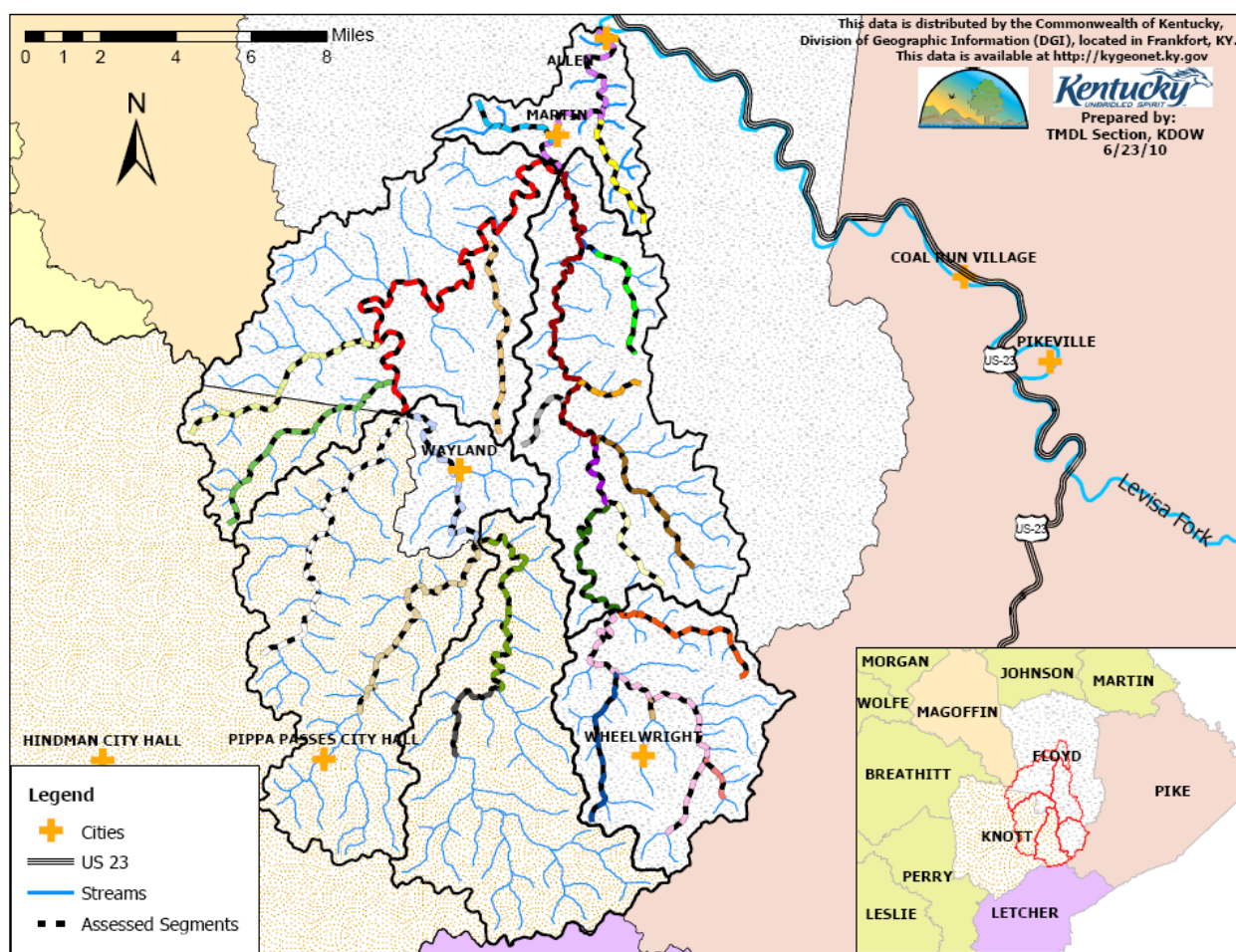


Figure S.1 Location of Beaver Creek Watershed in Floyd and Knott Counties of Eastern KY

The Kentucky Division of Water (KDOW) contracted with Eastern Kentucky University (EKU) to monitor for Escherichia coli (a pathogen indicator) in the Beaver Creek watershed, including the Right Fork and Left Fork of Beaver Creek and their major tributaries. This sampling was performed by the students and staff of the Eastern Kentucky Environmental Research Institute at EKU under the direction of Dr. Alice Jones and Environmental Specialist Reagan Butcher. This

document contains the monitoring results and describes TMDL development for pathogen indicators in the Beaver Creek watershed as required under Section 303(d) of the Clean Water Act. Table S.1 indicates the pathogen indicator impaired segments for which TMDLs are developed in this document.

Table S.1 Impaired Waterbodies Addressed in this TMDL Document

Waterbody & Segment	Total Size	Waterbody ID	County	Assessment Category	Use	Impairment	Suspected Source(s)
Arkansas Creek 0.0 to 3.6	3.6 miles	KY486027_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Beaver Creek 0.0 to 7.1	7.1 miles	KY486610_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	Municipal (Urbanized High Density Area), On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges, Unspecified Domestic Waste
Buck Branch 0.0 to 2.8	2.8 miles	KY488192_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Caleb Fork 0.0 to 1.2	1.2 miles	KY488598_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Caney Fork 0.0 to 7.5	7.5 miles	KY488862_01	Knott	5-NS	PCR	<u>Escherichia coli</u>	Package Plant or Other Permitted Small Flows Discharges
Clear Creek 0.0 to 4.9	4.9 miles	KY489611_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Frasure Creek 0.0 to 5.2	5.2 miles	KY492468_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Jacks Creek 0.0 to 4.4	4.4 miles	KY495089_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)

Waterbody & Segment	Total Size	Waterbody ID	County	Assessment Category	Use	Impairment	Suspected Source(s)
Jones Fork 0.0 to 9.9	9.9 miles	KY495499_01	Knott	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Left Fork Beaver Creek 0.0 to 11.4	11.4 miles	KY496194_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Left Fork Beaver Creek 11.4 to 13.55	2.15 miles	KY496194_02	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Left Fork Beaver Creek 18.7 to 28.6	5.3 miles	KY496194_04	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Otter Creek 0.0 to 0.5	0.5 miles	KY500021_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	Package Plant or Other Permitted Small Flows Discharges
Right Fork Beaver Creek 0.0 to 17.4	17.4 miles	KY501863_01	Floyd	5-NS, 5-NS	PCR, SCR	<u>Escherichia coli</u> , Fecal coliform	Inappropriate Waste Disposal
Right Fork Beaver Creek 17.4 to 23.3	5.9 miles	KY501863_02	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Right Fork Beaver Creek 30.3 to 33.4	2.9 miles	KY501863_04	Knott	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Salt Lick Creek 0.0 to 6.8	6.8 miles	KY502845_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)

Waterbody & Segment	Total Size	Waterbody ID	County	Assessment Category	Use	Impairment	Suspected Source(s)
Simpson Branch 0.0 to 1.8	1.8 miles	KY503532_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Sizemore Branch 0.0 to 2.0	2 miles	KY503590_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Spewing Camp Branch 0.0 to 3.1	3.1 miles	KY504061_01	Floyd	5-PS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Spurlock Creek 0.0 to 0.6	0.6 miles	KY504191_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Turkey Creek 0.0 to 5.9	5.9 miles	KY505598_01	Floyd	5-NS	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)

### Kentucky Water Quality Criteria (WQC):

According to 401 KAR 10:031,

*“The following criteria shall apply to waters designated as primary contact recreation use during the primary contact recreation season of May 1 through October 31: Fecal coliform content or Escherichia coli content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for Escherichia coli.”*

Additionally,

*“The following criteria shall apply to waters designated for secondary contact recreation use during the entire year: Fecal coliform content shall not exceed 1000 colonies per 100 ml as a thirty (30) day geometric mean based on not less than five (5) samples; nor exceed 2000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period.”*

### TMDL Components and Target:

A TMDL calculation is performed as follows:

$$\text{TMDL} = \text{WLA} + \text{LA} + \text{MOS}$$

Where:

TMDL = the Water Quality Criterion. This is defined as an instantaneous E. coli concentration of 240 colonies/100 ml.

WLA = the Waste Load Allocation. For this TMDL document, there are two types of WLAs: WLAs for KPDES-permitted sources and a Future Growth WLA. The KPDES-permitted WLAs are allowable loadings of pollutants into the stream from KPDES-permitted sources such as sewage treatment plants, package plants, and home units. The Future Growth WLA is a portion of the loading reserved for expanding and new KPDES-permitted sources.

LA = the Load Allocation, which is the allowable loading of pollutants into the stream from sources not permitted by KPDES and from natural background.

MOS = the Margin of Safety, which can be an implicit or explicit additional reduction applied to sources of pollutants that accounts for uncertainties in the data or TMDL calculations. For this TMDL an explicit MOS of 10% was applied and an implicit MOS was incorporated by calculating WLAs for KPDES-sources at their maximum design capacity.

TMDL Target = the TMDL minus the MOS (or 240 colonies/100 ml – 10% = 216 colonies/100 ml).

#### Seasonality

In Kentucky regulations, the PCR use is defined to apply to the period beginning May 1 and ending October 31. For this TMDL, seasonality is considered because samples were collected twice a month to provide data over the entire PCR season.

#### Critical Condition

The critical condition for nonpoint source E. coli (or fecal coliform) loadings is typically an extended dry period followed by a rainfall runoff event. Conversely, the critical condition for point source loading typically occurs during periods of low stream flow when dilution is minimized. Sampling was performed during both types of conditions (during or following rain events and during extended dry periods). The Beaver Creek watershed contains both types of sources; therefore the critical condition for each impaired segment is defined by the sample showing the greatest concentration, which was generally collected during rainfall events.

#### **TMDL Methodology:**

Mean Annual Flows (MAFs): MAFs were used to convert concentrations of E. coli into loads of E. coli. The MAF for each site was adjusted by either adding or subtracting flow based on any KPDES-permitted dischargers of pathogen indicators or KDOW permitted stream water withdrawals in the watershed upstream of a sample site (yielding the Adjusted MAF for that site).



Existing Loads: For each sample site, the sample with the greatest concentration of E. coli was used as the existing concentration for the site. Existing loads were calculated as:

$$\begin{array}{ccccccc} \text{Greatest} & & \text{Adjusted} & & \text{Conversion Factor} & & \\ \text{Concentration} & \times & \text{MAF} & \times & & = & \text{Existing Load (billion} \\ \text{(colonies/100ml)} & & \text{(cfs)} & & .0244657584 & & \text{colonies/day)} \end{array}$$

where the conversion factor converts cfs to ml/day and colonies to billion colonies.

Total TMDL: Total TMDLs were calculated for each site using the E. coli criterion of 240 colonies/100 ml:

$$\begin{array}{ccccccc} 240 & & \text{Adjusted} & & \text{Conversion Factor} & & \\ \text{(colonies/100ml)} & \times & \text{MAF} & \times & & = & \text{Total TMDL (billion} \\ & & \text{(cfs)} & & .0244657584 & & \text{colonies/day)} \end{array}$$

MOS: A 10% explicit MOS (i.e., 10% of the WQC, or 24 colonies/100ml,) was set. Additionally, an implicit MOS was incorporated in loading calculations for KPDES-permitted sources by setting their flow at the maximum design capacity. The explicit MOS load for each site was calculated as:

$$\begin{array}{ccccccc} 24 & & \text{Adjusted} & & \text{Conversion Factor} & & \\ \text{(colonies/100ml)} & \times & \text{MAF} & \times & & = & \text{MOS (billion} \\ & & \text{(cfs)} & & .0244657584 & & \text{colonies/day)} \end{array}$$

Target Load: The Target Load was calculated for each site by subtracting the explicit MOS from the Total TMDL (Target Load = Total TMDL – MOS).

Percent Reduction: Percent Reduction (%) = [(Existing Load – Target Load) / Existing Load] \* 100

Calculation of WLAs for Each KPDES-permitted Source: The WLAs are calculated based on the permitted concentration limits expressed in terms of E. coli limits and facility design flow (in units of cfs) using the following equation:

$$\begin{array}{ccccccc} 240 & & \text{Design} & & \text{Conversion Factor} & & \\ \text{(colonies/100ml)} & \times & \text{Flow} & \times & & = & \text{KPDES WLA (billion} \\ & & \text{(cfs)} & & .0244657584 & & \text{colonies/day)} \end{array}$$

The design capacity in MGD was converted to cfs by multiplying by 1.54723 to convert days to seconds and million gallons to cubic feet.

Calculation of Remainder: The Remainder is not part of the TMDL; however, it is used in the TMDL calculations. It is determined as the Target Load minus the sum of all WLAs for KPDES-permitted sources.

Calculation of Future Growth WLA: Future growth is represented by a portion of the TMDL Target that is set aside (i.e., is not part of the LA nor is it part of the WLA for current/known sources). The Future Growth WLA was calculated as the Remainder multiplied by the appropriate percentage from Table S.2 (Future Growth WLA = Remainder \* Future Growth WLA percentage).

Table S.2 Future Growth WLA Formula

Percent Developed Area	% of Remainder Set Aside for Future Growth WLA
≥25%	5%
≥20% – <25%	4%
≥15% – <20%	3%
≥10% – <15%	2%
≥5% – <10%	1%
<5%	0.5%

Calculation of LA: Load Allocations are calculated as LA= Remainder – Future Growth WLA. The available sampling data were insufficient to apportion the existing loading among the various LA sources; therefore, it is lumped to all LA sources.

### **TMDLs for Impaired Segments:**

TMDLs and loading allocations are summarized for each segment in Table S.3. All loads are expressed in units of billion E. coli colonies per day while percent reduction is expressed as a percentage.

### **Translation of WLAs into Permit Limits:**

All WLAs will be translated into KPDES permit limits as an E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average or as a Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average.

Table S.3 TMDLs for Impaired Segments

Loads are in units of billion E. coli colonies/ day	Percent Reduction is expressed as a percentage		Caleb Fork RM 0.0 to 1.2	Clear Creek RM 0.0 to 4.9	Jacks Creek RM 0.0 to 4.4	Otter Creek RM 0.0 to 0.5	Left Fork Beaver Creek RM 18.7 to 28.6	Frasure Creek RM 0.0 to 5.2	Simpson Branch RM 0.0 to 1.8	Spurlock Creek RM 0.0 to 0.6	Sizemore Branch RM 0.0 to 2.0	Spewing Camp Branch RM 0.0 to 3.1	Left Fork Beaver Creek RM 11.4 to 13.55	Left Fork Beaver Creek RM 0.0 to 11.4	Right Fork Beaver Creek RM 30.3 to 33.4	Caney Fork RM 0.0 to 7.5	Jones Fork RM 0.0 to 9.9	Right Fork Beaver Creek RM 17.4 to 23.3	Salt Lick Creek RM 0.0 to 6.8	Turkey Creek RM 0.0 to 5.9	Right Fork Beaver Creek RM 0.0 to 17.4	Arkansas Creek RM 0.0 to 3.6	Buck Branch RM 0.0 to 2.8	Beaver Creek 0.0 to 7.1
		Existing Load	5284.6038	13901.0933	1783.7241	9686.2876	69257.5721	27154.7145	3436.0145	6117.7027	3704.6737	4327.5145	90650.1145	126755.5507	1994.2419	549.4722	3243.4191	10391.2139	27133.8788	10107.7083	65184.6057	8035.3679	5798.3369	147268.9800
		Total TMDL	15.8538	41.7033	47.5660	29.0589	207.7727	91.7906	15.2712	29.9643	12.3489	19.9731	315.3047	573.9874	251.9042	191.1208	181.0280	608.2662	98.6687	41.1161	1203.4081	24.1061	21.7438	1860.2397
		MOS	1.5854	4.1703	4.7566	2.9059	20.7773	9.1791	1.5271	2.9964	1.2349	1.9973	31.5305	57.3987	25.1904	19.1121	18.1028	60.8266	9.8669	4.1116	120.3408	2.4106	2.1744	186.0240
		TMDL Target	14.2684	37.5330	42.8094	26.1530	186.9954	82.6115	13.7441	26.9678	11.1140	17.9758	283.7743	516.5887	226.7138	172.0087	162.9252	547.4396	88.8018	37.0045	1083.0673	21.6955	19.5694	1674.2158
AI #	KPDES #	percent reduction	99.73	99.73	97.60	99.73	99.73	99.70	99.60	99.56	99.70	99.58	99.69	99.59	88.63	68.70	94.98	94.73	99.67	99.63	98.34	99.73	99.66	98.86
1133	KYG400642	KPDES WLA																			0.0045			0.0045
1134	KY0085791	KPDES WLA												0.1817										0.1817
1143	KYG400479	KPDES WLA												0.0045										0.0045
1158	KYG400787	KPDES WLA																					0.0045	0.0045
1161	KYG400692	KPDES WLA								0.0045				0.0045										0.0045
1162	KYG400678	KPDES WLA								0.0045				0.0045										0.0045
1168	KYG400854	KPDES WLA									0.0045			0.0045										0.0045
1168	KYG401516	KPDES WLA									0.0045			0.0045										0.0045
1173	KYG400790	KPDES WLA		0.0045									0.0045	0.0045										0.0045
1180	KYG400520	KPDES WLA																					0.0045	0.0045
1182	KYG400614	KPDES WLA						0.0045						0.0045										0.0045
1196	KYG400590	KPDES WLA																			0.0045			0.0045
1199	KYG400603	KPDES WLA																	0.0045		0.0045			0.0045
1202	KYG400969	KPDES WLA						0.0045						0.0045										0.0045
1218	KYG400567	KPDES WLA									0.0045			0.0045										0.0045
1222	KYG400730	KPDES WLA																			0.0045			0.0045
1232	KYG400806	KPDES WLA																					0.0045	0.0045
1237	KYG400753	KPDES WLA		0.0045									0.0045	0.0045										0.0045
1243	KYG400915	KPDES WLA																0.0045			0.0045			0.0045
1248	KYG400593	KPDES WLA																				0.0045		0.0045
1255	KY0096342	KPDES WLA												0.1635										0.1635
1262	KY0026921	KPDES WLA																						1.0902
1263	KY0103136	KPDES WLA												0.0045										0.0045
1265	KYG400612	KPDES WLA																						0.0045
1266	KYG400970	KPDES WLA		0.0045									0.0045	0.0045										0.0045
1269	KYG400478	KPDES WLA						0.0045						0.0045										0.0045

Loads are in units of billion E. coli colonies/day	Percent Reduction is expressed as a percentage		Caleb Fork RM 0.0 to 1.2	Clear Creek RM 0.0 to 4.9	Jacks Creek RM 0.0 to 4.4	Otter Creek RM 0.0 to 0.5	Left Fork Beaver Creek RM 18.7 to 28.6	Frasure Creek RM 0.0 to 5.2	Simpson Branch RM 0.0 to 1.8	Spurlock Creek RM 0.0 to 0.6	Sizemore Branch RM 0.0 to 2.0	Spewing Camp Branch RM 0.0 to 3.1	Left Fork Beaver Creek RM 11.4 to 13.55	Left Fork Beaver Creek RM 0.0 to 11.4	Right Fork Beaver Creek RM 30.3 to 33.4	Caney Fork RM 0.0 to 7.5	Jones Fork RM 0.0 to 9.9	Right Fork Beaver Creek RM 17.4 to 23.3	Salt Lick Creek RM 0.0 to 6.8	Turkey Creek RM 0.0 to 5.9	Right Fork Beaver Creek RM 0.0 to 17.4	Arkansas Creek RM 0.0 to 3.6	Buck Branch RM 0.0 to 2.8	Beaver Creek 0.0 to 7.1
1270	KYG400666	KPDES WLA																			0.0045			0.0045
1274	KYG400714	KPDES WLA											0.0045	0.0045										0.0045
1276	KYG400975	KPDES WLA																		0.0045	0.0045			0.0045
1293	KYG400836	KPDES WLA																0.0045			0.0045			0.0045
1304	KYG400339	KPDES WLA																				0.0045		0.0045
1305	KY0103233	KPDES WLA												0.0899										0.0899
1314	KYG400844	KPDES WLA																	0.0045		0.0045			0.0045
1315	KYG400677	KPDES WLA								0.0045				0.0045										0.0045
1327	KYG400601	KPDES WLA						0.0045						0.0045										0.0045
1328	KYG400936	KPDES WLA																				0.0045		0.0045
1343	KYG400778	KPDES WLA																			0.0045			0.0045
1352	KY0072974	KPDES WLA																			0.2271			0.2271
1367	KYG400579	KPDES WLA												0.0045										0.0045
1369	KYG400724	KPDES WLA									0.0045			0.0045										0.0045
2514	KY0094510	KPDES WLA															0.0273				0.0273			0.0273
2517	KY0083089	KPDES WLA															0.0908				0.0908			0.0908
2527	KY0042854	KPDES WLA														0.9085		0.9085			0.9085			0.9085
4250	KYG400659	KPDES WLA												0.0045										0.0045
4327	KYG401073	KPDES WLA																			0.0045			0.0045
4331	KYG401143	KPDES WLA																				0.0045		0.0045
4332	KYG401142	KPDES WLA												0.0045										0.0045
4333	KYG401140	KPDES WLA											0.0045	0.0045										0.0045
4336	KYG401125	KPDES WLA																0.0045			0.0045			0.0045
4342	KYG401126	KPDES WLA																				0.0045		0.0045
4344	KYG401121	KPDES WLA																		0.0045	0.0045			0.0045
4349	KYG401133	KPDES WLA			0.0045		0.0045						0.0045	0.0045										0.0045
4350	KYG401113	KPDES WLA																	0.0045		0.0045			0.0045
4356	KYG401040	KPDES WLA						0.0045						0.0045										0.0045
4405	KYG401197	KPDES WLA										0.0045	0.0045	0.0045										0.0045
12253	KYG401218	KPDES WLA																			0.0045			0.0045
15635	KYG401271	KPDES WLA												0.0045										0.0045

Loads are in units of billion E. coli colonies/day	Percent Reduction is expressed as a percentage		Caleb Fork RM 0.0 to 1.2	Clear Creek RM 0.0 to 4.9	Jacks Creek RM 0.0 to 4.4	Otter Creek RM 0.0 to 0.5	Left Fork Beaver Creek RM 18.7 to 28.6	Frasure Creek RM 0.0 to 5.2	Simpson Branch RM 0.0 to 1.8	Spurlock Creek RM 0.0 to 0.6	Sizemore Branch RM 0.0 to 2.0	Spewing Camp Branch RM 0.0 to 3.1	Left Fork Beaver Creek RM 11.4 to 13.55	Left Fork Beaver Creek RM 0.0 to 11.4	Right Fork Beaver Creek RM 30.3 to 33.4	Caney Fork RM 0.0 to 7.5	Jones Fork RM 0.0 to 9.9	Right Fork Beaver Creek RM 17.4 to 23.3	Salt Lick Creek RM 0.0 to 6.8	Turkey Creek RM 0.0 to 5.9	Right Fork Beaver Creek RM 0.0 to 17.4	Arkansas Creek RM 0.0 to 3.6	Buck Branch RM 0.0 to 2.8	Beaver Creek 0.0 to 7.1
15655	KYG401296	KPDES WLA																			0.0045			0.0045
15807	KYG401352	KPDES WLA																			0.0045			0.0045
33378	KYG401353	KPDES WLA																			0.0045			0.0045
33945	KY0077542	KPDES WLA													0.0636			0.0636						0.0636
35251	KY0089435	KPDES WLA					0.0618						0.0618	0.0618										0.0618
35252	KY0079421	KPDES WLA						0.1363						0.1363										0.1363
35254	KY0079430	KPDES WLA																			0.0999			0.0999
35258	KY0093017	KPDES WLA																			0.0727			0.0727
35260	KY0093912	KPDES WLA					0.1363						0.1363	0.1363										0.1363
35260	KY0107051	KPDES WLA																			0.2271			0.2271
35359	KY0087076	KPDES WLA															0.0545				0.0545			0.0545
35761	KY0105228	KPDES WLA																0.9085			0.9085			0.9085
35887	KYG401533	KPDES WLA						0.0045					0.0045											0.0045
35892	KYG401529	KPDES WLA																						0.0045
36057	KYG401541	KPDES WLA																						0.0045
40534	KY0028789	KPDES WLA				2.0441	2.0441						2.0441	2.0441										2.0441
43120	KYG401540	KPDES WLA																			0.0045			0.0045
43224	KYG401548	KPDES WLA																			0.0045			0.0045
44695	KYG401580	KPDES WLA				0.0045	0.0045						0.0045	0.0045										0.0045
45070	KYG401590	KPDES WLA												0.0045										0.0045
45073	KYG401582	KPDES WLA												0.0045										0.0045
45396	KYG401587	KPDES WLA												0.0045										0.0045
46144	KYG401601	KPDES WLA								0.0045				0.0045										0.0045
46147	KYG401603	KPDES WLA															0.0045				0.0045			0.0045
47022	KYG401638	KPDES WLA																			0.0045			0.0045
48864	KYG401645	KPDES WLA												0.0045										0.0045
48897	KYG401646	KPDES WLA					0.0045						0.0045	0.0045										0.0045
49354	KYG401654	KPDES WLA										0.0045	0.0045	0.0045										0.0045
50021	KYG401692	KPDES WLA						0.0045						0.0045										0.0045
50138	KYG401699	KPDES WLA																						0.0045
50627	KYG401721	KPDES WLA																		0.0045	0.0045			0.0045

Loads are in units of billion E. coli colonies/day	Percent Reduction is expressed as a percentage		Caleb Fork RM 0.0 to 1.2	Clear Creek RM 0.0 to 4.9	Jacks Creek RM 0.0 to 4.4	Otter Creek RM 0.0 to 0.5	Left Fork Beaver Creek RM 18.7 to 28.6	Frasure Creek RM 0.0 to 5.2	Simpson Branch RM 0.0 to 1.8	Spurlock Creek RM 0.0 to 0.6	Sizemore Branch RM 0.0 to 2.0	Spewing Camp Branch RM 0.0 to 3.1	Left Fork Beaver Creek RM 11.4 to 13.55	Left Fork Beaver Creek RM 0.0 to 11.4	Right Fork Beaver Creek RM 30.3 to 33.4	Caney Fork RM 0.0 to 7.5	Jones Fork RM 0.0 to 9.9	Right Fork Beaver Creek RM 17.4 to 23.3	Salt Lick Creek RM 0.0 to 6.8	Turkey Creek RM 0.0 to 5.9	Right Fork Beaver Creek RM 0.0 to 17.4	Arkansas Creek RM 0.0 to 3.6	Buck Branch RM 0.0 to 2.8	Beaver Creek 0.0 to 7.1
50950	KYG401730	KPDES WLA																	0.0045		0.0045			0.0045
53921	KYG401764	KPDES WLA																				0.0045		0.0045
54879	KYG401772	KPDES WLA																			0.0045			0.0045
71436	KYG401809	KPDES WLA						0.0045					0.0045											0.0045
74022	KYG401406	KPDES WLA							0.0045				0.0045											0.0045
74025	KYG401409	KPDES WLA											0.0045											0.0045
74062	KYG401442	KPDES WLA											0.0045	0.0045										0.0045
74181	KYG401470	KPDES WLA					0.0045						0.0045	0.0045										0.0045
74185	KYG401475	KPDES WLA																	0.0045		0.0045			0.0045
74243	KYG401821	KPDES WLA						0.0045					0.0045											0.0045
75141	KYG401851	KPDES WLA											0.0045											0.0045
75556	KYG401857	KPDES WLA																			0.0045			0.0045
75746	KYG401868	KPDES WLA																				0.0045		0.0045
76078	KYG401876	KPDES WLA																			0.0045			0.0045
76185	KYG401883	KPDES WLA																				0.0045		0.0045
79525	KYG401931	KPDES WLA						0.0045					0.0045											0.0045
79842	KYG401936	KPDES WLA																						0.0045
81193	KYG401970	KPDES WLA						0.0045					0.0045											0.0045
81570	KYG401981	KPDES WLA																			0.0045			0.0045
82092	KY0106755	KPDES WLA																			0.0545			0.0545
82471	KYG402002	KPDES WLA											0.0045											0.0045
84292	KYG402025	KPDES WLA																			0.0045			0.0045
97291	KYG402063	KPDES WLA																			0.0045			0.0045
103052	KYG402117	KPDES WLA						0.0045					0.0045											0.0045
1297	KY0027413	KPDES WLA																						0.0000
		Total KPDES WLA	0.000	0.0135	0.0045	2.0486	2.2602	0.1903	0.0045	0.018	0.018	0.009	2.2962	3.0206	0.0636	0.9085	0.1771	1.8941	0.0225	0.0135	2.8104	0.0315	0.018	7.060855
		remainder	14.2684	37.5193	42.8048	24.1043	184.7351	82.4207	13.7395	26.9497	11.0959	17.9667	281.4776	513.5661	226.6502	171.1002	162.7481	545.5453	88.7791	36.9909	1080.2555	21.6637	19.5512	1667.1549
		Future Growth WLA <sup>(1)</sup>	0.0713	0.3752	0.4280	0.2410	1.8474	0.8242	0.0687	0.2695	0.1110	0.0898	2.8148	5.1357	2.2665	0.8555	0.8137	5.4555	0.8878	0.1850	10.8026	0.2166	0.1955	16.6715
		Total WLA	0.07134	0.3887	0.4325	2.2896	4.1076	1.0145	0.0732	0.2875	0.129	0.0988	5.111	8.1563	2.3301	1.764	0.9908	7.3496	0.9103	0.1985	13.613	0.2481	0.2135	23.7324
		LA	14.1971	37.1441	42.3768	23.8633	182.8877	81.5965	13.6708	26.6802	10.9849	17.8769	278.6628	508.4304	224.3837	170.2447	161.9343	540.0899	87.8913	36.8059	1069.4529	21.4471	19.3557	1650.4834

Note:  
<sup>(1)</sup> Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

## **1.0 Introduction**

### **1.1 Section 303(d) Requirements**

Section 303(d) of the Clean Water Act (1972) requires states to identify waters within their boundaries that have been assessed and are not currently meeting their designated uses (per 401 KAR 10:026 and 10:031) and that require a Total Maximum Daily Load (TMDL). States must establish a priority ranking for such waters, taking into account their intended uses and the severity of the pollutant. Section 303(d) also requires that states provide a list of this information called the 303(d) list. This list is submitted to the Environmental Protection Agency (EPA) during even numbered years and each submittal replaces the previous list. The 2008-303(d) information for Kentucky can be found in the *2008 Integrated Report to Congress on the Condition of Water Resources in Kentucky Volume II. 303(d) List of Surface Waters* (Kentucky Division of Water [KDOW], 2008a) and can be obtained at: <http://water.ky.gov>.

States are required to develop TMDLs for the listed pollutants that cause a waterbody to fail to meet its designated uses. The TMDL process establishes the allowable amount (i.e. “load”) of pollutant a waterbody can naturally assimilate while continuing to meet the water quality criteria (WQC) for each designated use. The pollutant load must be established at a level necessary to implement the applicable WQC with seasonal variations and a margin of safety (MOS) which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality. This total load is then divided among different sources of the pollutant in a watershed. Information from EPA on TMDLs can be found at: <http://www.epa.gov/owow/tmdl>.

### **1.2 TMDL Definitions**

A Total Maximum Daily Load (TMDL) = Waste Load Allocation (WLA) + Load Allocation (LA) + Margin of Safety (MOS), where:

TMDL = the maximum amount of a pollutant that a waterbody can receive over a one day period and not be impaired for its designated use(s). This amount must be determined as a load (mass/day or colonies/day).

WLA = the part of the TMDL that is portioned among sources that are regulated under the Kentucky Pollutant Discharge Elimination System (KPDES) program in KY. These sources are often referred to as point sources because they frequently, but not always, discharge through a pipe directly to a waterbody. These sources require a KPDES permit that places limits on the amount of pollutant that can be legally discharged to a waterbody. For this document, the WLA has two components, the KPDES-permitted WLA (for sources mentioned above) and a Future Growth WLA (a portion of the loading reserved for expanding and new KPDES-permitted sources).

LA = the part of the TMDL that is portioned among sources that do not require a KPDES-permit. These sources are often referred to as nonpoint sources because they tend to discharge to a



waterbody following periods of rain or snow melt that wash the pollutant into the waterbody. Natural background levels of a pollutant are also included in this category.

MOS = an implicit (using conservative assumptions) or explicit (a reserved portion) additional reduction applied to the WLA, LA or both types of sources that accounts for uncertainties in the data or TMDL calculations.

### **1.3 Beaver Creek Watershed**

Beaver Creek and Right Fork Beaver Creek were 303(d) listed on the 2008 Integrated Report for the Primary Contact Recreation (PCR) use due to fecal coliform (a pathogen indicator) (KDOW, 2008a). The Beaver Creek Watershed is located in the Big Sandy River Basin in Floyd and Knott Counties and encompasses the cities of Wheelwright and Pippa Passes in its headwaters, Wayland in its midst, and Martin and Allen near its confluence with Levisa Fork. A map depicting the location of the Beaver Creek Watershed is shown in Figure 1.1.

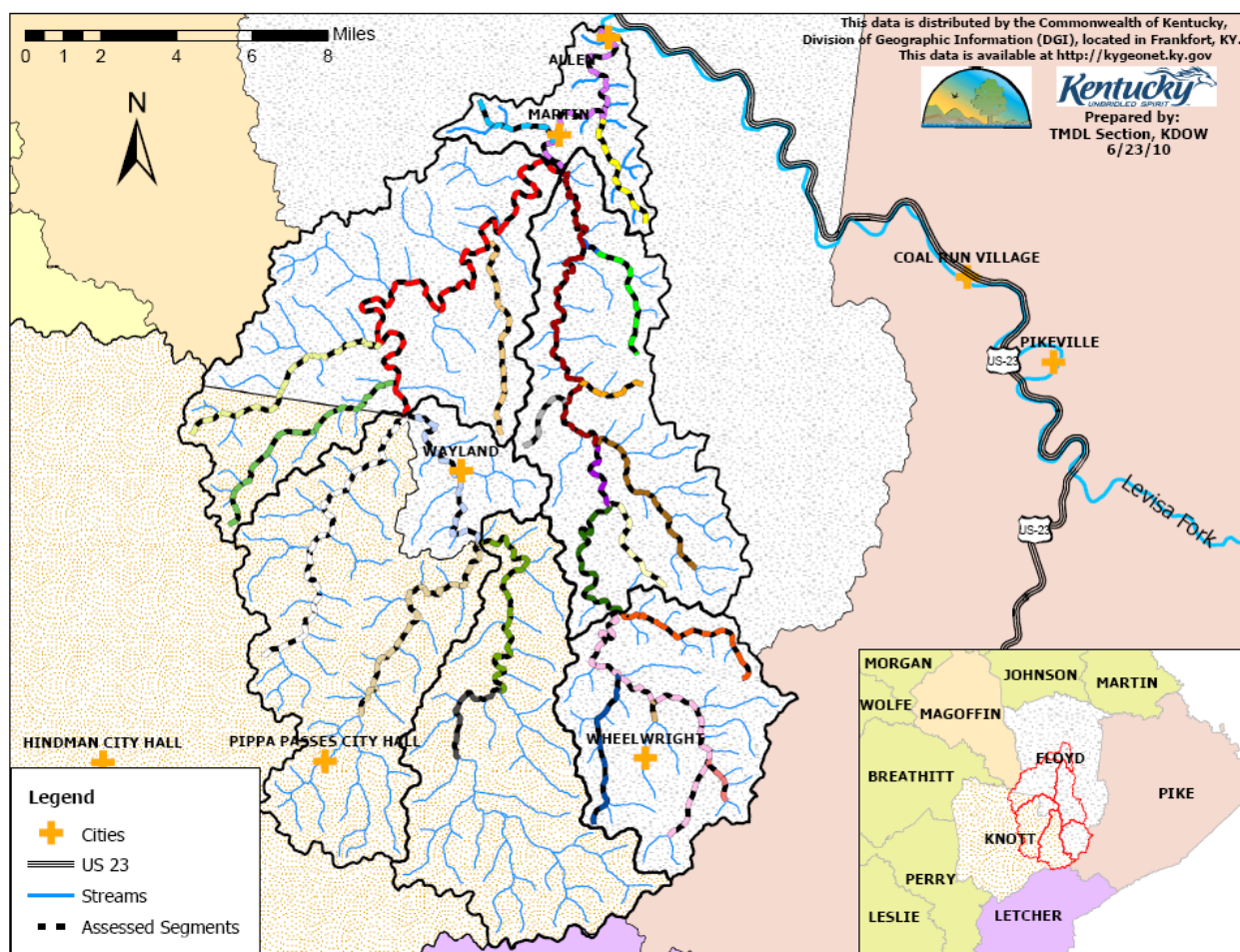


Figure 1.1 Location of Beaver Creek Watershed in Floyd and Knott Counties of Eastern KY



KDOW contracted with Eastern Kentucky University (EKU) to monitor for Escherichia coli (E. coli, another pathogen indicator) in the Beaver Creek watershed, including the Right Fork and Left Fork of Beaver Creek and their major tributaries. This sampling was performed by the students and staff of the Eastern Kentucky Environmental Research Institute at EKU under the direction of Dr. Alice Jones and Environmental Specialist Reagan Butcher. This document contains the monitoring results and describes TMDL development for pathogen indicators in the Beaver Creek watershed as required under Section 303(d) of the Clean Water Act.

## 2.0 Problem Definition

The Clean Water Act requires states to designate uses for surface waters within their jurisdiction. The designated uses assigned to waterbodies in Kentucky can be found in 401 KAR 10:026 and includes primary contact recreation (PCR) and secondary contact recreation (SCR). 401 KAR 10:001 defines PCR waters as those “waters suitable for full body contact recreation during the recreation season of May 1 through October 31” and SCR waters as “waters suitable for partial body contact recreation, with minimal threat to public health due to water quality.” 401 KAR 10:031 establishes standards that are “minimum requirements that apply to all surface waters in the Commonwealth of Kentucky in order to maintain and protect them for designated uses.” The pathogen-related Water Quality Criteria (WQC) in 401 KAR 10:031 are based upon those proposed by EPA in 1986 (EPA, 1986) and, at the levels established, would cause an estimated occurrence of illness in 8 out of 1000 swimmers in fresh waters.

The term pathogen refers to bacteria, viruses, or other biological agents (like parasites) that can cause disease. Because it is currently resource intensive, difficult, and a potential health hazard to detect most pathogens in water, other organisms are used to indicate whether the presence of pathogens is likely in waters. Like EPA’s proposed criteria, Kentucky uses fecal coliform bacteria and Escherichia coli (E. coli) bacteria as indicator organisms of pathogens. Fecal coliform and E. coli are found in the fecal waste of humans and warm-blooded animals (birds and mammals). The presence of these bacteria in a waterbody indicates that contamination from human or animal wastes has occurred and that pathogens may be present. Per 401 KAR 10:031:

*“The following criteria shall apply to waters designated as primary contact recreation use during the primary contact recreation season of May 1 through October 31: Fecal coliform content or Escherichia coli content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for Escherichia coli.”*

Additionally,

*“The following criteria shall apply to waters designated for secondary contact recreation use during the entire year: Fecal coliform content shall not exceed 1000 colonies per 100 ml as a thirty (30) day geometric mean based on not less than five (5) samples; nor exceed 2000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period.”*

EPA and the Council of State Territorial Epidemiologist maintain a Waterborne Disease and Outbreak Surveillance System to report water-related disease outbreaks. Their reports can be obtained at <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5709a1.htm>. The latest report from 2008 provides information on waterborne disease outbreaks across the United States during 2005 and 2006. During this period, 13 outbreaks of gastroenteritis from swimming in lakes or rivers were reported, along with five fatal cases of Primary Amebic Meningoencephalitis (caused by an ameba; Naegleria fowleri), two outbreaks of Leptospirosis (affecting 46 people), and two outbreaks of cercarial dermatitis (caused by avian schistosomes) (Yoder, et. al. 2008). The

number of unreported cases of waterborne diseases contacted by people recreating in and around natural freshwaters is unknown.

Beaver Creek from river miles (RM) 0.0 to 7.1 was first listed as impaired for pathogens on the 2004-303(d) list (KDOW, 2005a). This initial listing was carried forward to the 2006 303(d) list when the Right Fork of Beaver Creek from RM 0.0 to 17.4 was also listed as impaired for pathogens (KDOW, 2007). During the 2008 listing cycle, these pathogen listings were more correctly identified with the indicator organism used; in this case fecal coliform (KDOW, 2008a). KDOW contracted with Eastern Kentucky University to collect Escherichia coli data in the Beaver Creek Watershed during the 2007 and 2008 PCR seasons. The assessment results from this monitoring effort indicated that many additional stream segments within the watershed were impaired for the PCR use. On the draft 2010 list, these additional segments are proposed for listing for E. coli, which will result in the 22 listings shown in Table 2.1 (KDOW, 2010a). KDOW designates a waterbody as partial support for PCR if 20 to 33% of samples collected exceed the PCR or SCR maximum criteria and nonsupport if greater than 33% of samples collected exceed these criteria. In addition to the segments found to be impaired, four segments were found to be fully supporting for the pathogen PCR use as shown in Table 2.2.

Table 2.1 Proposed 2010 303(d) Listings for Pathogen Indicators in the Beaver Creek Watershed

Waterbody & Segment	County	Support Status	Use	Pollutant	Suspected Source(s)
Arkansas Creek 0.0 to 3.6	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Beaver Creek 0.0 to 7.1	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	Municipal (Urbanized High Density Area), On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges, Unspecified Domestic Waste
Buck Branch 0.0 to 2.8	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Caleb Fork 0.0 to 1.2	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Caney Fork 0.0 to 7.5	Knott	Nonsupport	PCR	<u>Escherichia coli</u>	Package Plant or Other Permitted Small Flows Discharges
Clear Creek 0.0 to 4.9	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Frasure Creek 0.0 to 5.2	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Jacks Creek 0.0 to 4.4	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Jones Fork 0.0 to 9.9	Knott	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Left Fork Beaver Creek 0.0 to 11.4	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges

Waterbody & Segment	County	Support Status	Use	Pollutant	Suspected Source(s)
Left Fork Beaver Creek 11.4 to 13.55	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Left Fork Beaver Creek 18.7 to 28.6	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Otter Creek 0.0 to 0.5	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	Package Plant or Other Permitted Small Flows Discharges
Right Fork Beaver Creek 0.0 to 17.4	Floyd	Nonsupport	PCR, SCR	<u>Escherichia coli</u> , Fecal coliform	Inappropriate Waste Disposal
Right Fork Beaver Creek 17.4 to 23.3	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Right Fork Beaver Creek 30.3 to 33.4	Knott	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Salt Lick Creek 0.0 to 6.8	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Simpson Branch 0.0 to 1.8	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Sizemore Branch 0.0 to 2.0	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Spewing Camp Branch 0.0 to 3.1	Floyd	Partial Support	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Spurlock Creek 0.0 to 0.6	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Turkey Creek 0.0 to 5.9	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)

Table 2.2 Proposed PCR-Use Fully Supporting Segments in the Beaver Creek Watershed

Waterbody & Segment	County	Support Status	Use
Spurlock 0.6 to 4.0	Floyd	Full Support	PCR
Left Fork Beaver Creek 13.55 to 18.7	Floyd	Full Support	PCR
Rock Fork 0.0 to 7.0	Floyd	Full Support	PCR
Right Fork Beaver Creek 23.3 to 30.3	Knott	Full Support	PCR

## 3.0 Physical Setting

### 3.1 Location

Beaver Creek is located Floyd (population 42,441) and Knott (population 17,649) Counties, west of Pikeville and US 23, and encompasses the cities of Wheelwright (population 1,042) and Pippa Passes (population 297) in its headwaters, Wayland (population 298) in its midst, and Martin (population 633) and Allen (population 150) near its confluence with Levisa Fork (U.S. Census Bureau 2007). Figure 1.1 showed the location of the Beaver Creek Watershed. The Beaver Creek watershed is in the Big Sandy River Basin, United States Geological Survey (USGS) 6-digit hydrologic unit code (HUC) # 050702. The system of HUCs was developed by the USGS to identify specific watersheds (all the land area that drains to a particular stream) (USGS, 2004). The larger the HUC number, the smaller the watershed and the more specific the identification of a watershed to one particular stream.

The Beaver Creek Watershed is in the Eastern Kentucky physiographic region, in the Level III Ecoregion of the Central Appalachians (Figure 3.1). Information from Woods, et. al. (2002) indicates that this Ecoregion is dominated by forested hills with narrow ridges and narrow valleys. Streams in this area have moderate to high gradients with cobble or boulder substrates. Surface and underground bituminous coal mines, logging, and oil and gas production are common in this Ecoregion, while agriculture is limited due to the rugged terrain and nutrient poor soils. The Beaver Creek watershed is approximately 240 square miles in area.

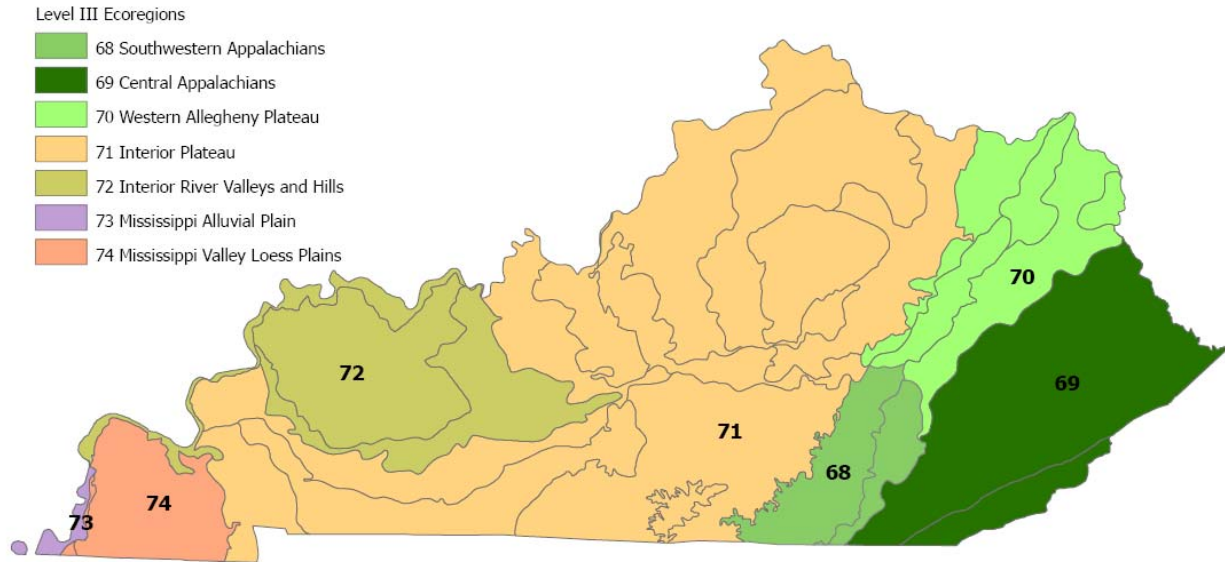


Figure 3.1 Level III Ecoregions in Kentucky after Woods et. al., 2002

Because of its size, the Beaver Creek Watershed was divided into six smaller subwatersheds to display information. These six subwatersheds are Mainstem Beaver Creek, Lower Left Fork Beaver Creek, Upper Left Fork Beaver Creek, Lower Right Fork Beaver Creek, Middle Right Fork Beaver Creek, and Upper Right Fork Beaver Creek. The HUC14s that are in each of these six subwatersheds and the areas of each are in Tables 3.1 through 3.6.

Table 3.1 HUC14s in the Mainstem Beaver Creek Subwatershed

HUC14	NAME	SQUARE MILES	ACRES
05070203065050	Beaver Creek	3.95	2526.85
05070203065030	Beaver Creek	1.69	1081.64
05070203065020	Buck Branch	2.97	1899.04
05070203065040	Arkansas Creek	3.11	1992.52
05070203065010	Beaver Creek	0.46	296.17
<b>Total</b>		12.18	7796.22

Table 3.2 HUC14s in the Lower Left Fork Beaver Creek Subwatershed

HUC14	NAME	SQUARE MILES	ACRES
05070203050370	Left Fork Beaver Creek	3.73	2385.93
05070203050350	Left Fork Beaver Creek	8.09	5176.96
05070203050360	Spurlock Creek	3.88	2485.90
05070203050340	Simpson Branch	1.94	1243.35
05070203050330	Left Fork Beaver Creek	0.55	351.97
05070203050320	Sizemore Branch	1.77	1132.22
05070203050280	Frasure Creek	1.4	894.80
05070203050310	Left Fork Beaver Creek	0.86	548.95
05070203050290	Left Fork Beaver Creek	0.39	250.81
05070203050270	Hall Fork	1.82	1161.87
05070203050300	Doty Branch	1.65	1055.67
05070203050190	Left Fork Beaver Creek	1.3	830.93
05070203050260	Frasure Creek	1.09	698.42
05070203050250	Hoods Fork	1.52	975.22
05070203050180	Spewing Camp Creek	2.49	1594.18
05070203050170	Left Fork Beaver Creek	4.84	3099.27
05070203050240	Frasure Creek	0.39	250.73
05070203050230	Ned Fork	1.78	1138.58
05070203050220	Frasure Creek	0.75	481.91
05070203050210	Biglick Branch	0.62	394.79
05070203050200	Frasure Creek	2.16	1381.14
<b>Total</b>		43.02	27533.60

Table 3.3 HUC14s in the Upper Left Fork Beaver Creek Subwatershed

HUC14	NAME	SQUARE MILES	ACRES
05070203050160	Clear Creek	5.26	3369.02
05070203050150	Left Fork Beaver Creek	3.02	1929.34
05070203050110	Left Fork Beaver Creek	2.20	1407.71
05070203050140	Jacks Creek	4.10	2626.35
05070203050060	Abner Fork	1.80	1196.98
05070203050070	Left Fork Beaver Creek	0.88	562.46
05070203050100	Otter Creek	0.24	156.22
05070203050050	Left Fork Beaver Creek	0.20	128.34
05070203050040	Henpen Branch	1.39	887.79
05070203050090	Left Fork of Otter Creek	1	637.38
05070203050080	Right Fork of Otter Creek	2.08	1329.80
05070203050030	Left Fork Beaver Creek	1.34	860.44
05070203050010	Left Fork Beaver Creek	3.38	2163.29
05070203050020	Caleb Fork	1.91	1222.77
05070203050130	Frozen Fork	0.97	618.04
05070203050120	Jacks Creek	0.76	485.74
<b>Total</b>		30.6	19581.67

Table 3.4 HUC14s in the Lower Right Fork Beaver Creek Subwatershed

HUC14	NAME	SQUARE MILES	ACRES
05070203060760	Stephens Branch	2.70	1730.00
05070203060770	Right Fork Beaver Creek	0.90	577.52
05070203060720	Wilson Creek	3.14	2011.34
05070203060750	Right Fork Beaver Creek	4.36	2792.32
05070203060680	Brush Creek	5.81	3715.94
05070203060690	Right Fork Beaver Creek	1.85	1184.05
05070203060730	Right Fork Beaver Creek	0.36	229.68
05070203060740	Turkey Creek	5.3	3390.29
05070203060710	Right Fork Beaver Creek	1.59	1019.72
05070203060660	Saltlick Creek	7.06	4517.03
05070203060670	Right Fork Beaver Creek	1.11	707.14
05070203060630	Right Fork Beaver Creek	1.72	1101.69
05070203060700	Goose Creek	2.76	1767.51
05070203060650	Lick Fork	1.55	990.10
05070203060620	Rock Fork	8.33	5330.81
05070203060600	Stonecoal Branch	1.82	1164.70
05070203060640	Saltlick Creek	3.99	2551.79
05070203060610	Right Fork Beaver Creek	0.09	57.72
05070203060590	Right Fork Beaver Creek	0.41	261.51
<b>Total</b>		54.84	35100.86

Table 3.5 HUC14s in the Middle Right Fork Beaver Creek Subwatershed

HUC14	NAME	SQUARE MILES	ACRES
05070203060430	Right Fork Beaver Creek	3.10	1986.23
05070203060580	Jones Fork	3.9	2493.63
05070203060420	Steele Creek	3.42	2185.61
05070203060560	Jones Fork	0.78	495.76
05070203060550	Fourmile Branch	1.89	1206.82
05070203060410	Right Fork Beaver Creek	0.16	99.36
05070203060400	Mill Creek	1.57	1006.39
05070203060570	Big Springs Branch	1.54	982.63
05070203060390	Right Fork Beaver Creek	1.99	1273.71
05070203060540	Jones Fork	0.54	343.52
05070203060500	Bruce Branch	0.87	553.74
05070203060520	Jones Fork	0.42	267.15
05070203060510	Ball Branch	0.25	160.01
05070203060530	Bear Branch	2.31	1477.09
05070203060490	Ball Branch	1.96	1251.11
05070203060380	Caney Fork	1.14	726.38
05070203060480	Jones Fork	1.94	1243.08
05070203060360	Caney Fork	7.96	5096.21
05070203060470	Turtle Branch	0.87	556.30
05070203060370	Big Branch	1.03	656.37
05070203060460	Jones Fork	1.36	871.83
05070203060440	Long Fork	3.13	2003.84
05070203060450	Terry Fork	1.19	762.85
05070203060340	Caney Fork	1.07	681.90
05070203060350	Hempatch Branch	1.09	699.28
05070203060300	Caney Fork	2.55	1632.60
05070203060330	Hollybush Creek	0.64	407.52
05070203060320	Left Fork of Hollybush Creek	2.61	1669.22
05070203060310	Hollybush Creek	3.27	2091.19
05070203060280	Short Fork	2.20	1409.01
05070203060290	Trace Fork	1.00	641.70
<b>Total</b>		57.71	36932.04



Table 3.6 HUC14s in the Upper Right Fork Beaver Creek Subwatershed

HUC14	NAME	SQUARE MILES	ACRES
05070203060270	Right Fork Beaver Creek	2.52	1609.37
05070203060250	Right Fork Beaver Creek	1.94	1242.39
05070203060260	Salisbury Branch	1.68	1072.99
05070203060240	Patten Branch	1.36	867.02
05070203060230	Right Fork Beaver Creek	3.45	2207.83
05070203060170	Right Fork Beaver Creek	1.34	859.45
05070203060190	Right Fork Beaver Creek	0.19	122.00
05070203060220	Dry Creek	1.12	718.88
05070203060180	Potato Branch	0.9	575.17
05070203060160	Hall Branch	1.53	981.89
05070203060150	Right Fork Beaver Creek	0.93	596.14
05070203060210	Left Fork of Dry Creek	1.4	895.36
05070203060200	Dry Creek	2.59	1657.76
05070203060130	Right Fork Beaver Creek	0.1	636.50
05070203060140	Mullins Branch	1.50	959.76
05070203060120	Bates Branch	1.60	1025.76
05070203060100	Righthand Fork	3.77	2412.53
05070203060110	Right Fork Beaver Creek	0.03	15.93
05070203060090	Right Fork Beaver Creek	0.27	175.48
05070203060070	Right Fork Beaver Creek	0.24	151.37
05070203060050	Right Fork Beaver Creek	1.28	819.03
05070203060080	Joe King Branch	0.90	575.91
05070203060060	Puncheon Branch	4.25	2720.28
05070203060040	Arnold Fork	3.51	2243.54
05070203060030	Isaac Fork	1.03	660.24
05070203060020	West Fork of Isaac Fork	0.7	445.56
05070203060010	Isaac Fork	1.45	924.53
<b>Total</b>		<b>42.46</b>	<b>27172.67</b>

### **3.2 Hydrology**

The Beaver Creek Watershed headwater tributaries begin in Knott and Floyd counties at their southern boundary with Letcher and Pike counties and flow northward to their confluence with Levisa Fork in Floyd County. The Left Fork and Right Fork of Beaver Creek merge to form the mainstem of Beaver Creek just south of the city of Martin. KDOW follows the Strahler (1952) method for stream order determination where small upstream segments with no tributaries are first order. When two first order streams merge, they form a second order stream segment; two second order segments merge to form a third order segment and so on. In this method, a first order segment merging with a second order segment results in a continuation of the second order

segment, order only increases when segments with the same order merge or if a tributary to a main segment has a larger order. First order streams tend to be small and carry little flow except during wet weather events while larger stream orders indicate larger systems with greater flow. At its confluence with Levisa Fork, Beaver Creek is a fifth order stream, while the Left Fork and Right Fork are both fourth order at their confluence.

Stream slopes were determined using a 30M Digital Elevation Model. Elevation at the upstream end of blue line streams on a 1:24 scale was determined and the highest elevations for the Left Fork and Right Fork were selected to determine stream slope. The lowest elevation for the Right and Left Fork was assumed to be at their confluence and the lowest elevation for Beaver mainstem was assumed to be at its mouth. Figure 3.2 shows the elevation points used to determine slopes in the watershed. The highest elevation in the Left Fork of Beaver Creek is along Stonecoal Fork at 1800 ft above mean sea level (msl). The lowest elevation in the Left Fork is at its confluence with the Right Fork at 639 ft msl. The stream length along this path is 27.5 miles providing a slope in the Left Fork of 42.2 ft/mile. The highest elevation in the Right Fork is along the Left Fork of Holly Bush at 1556 ft msl. The lowest elevation is its confluence with the Left Fork at 639 msl. The stream length along this path is 35.4 miles, providing a slope in the Right Fork of 25.9 ft/mile. The mouth of Beaver Creek is at an elevation of 624 ft msl and the length from its highest point on Stonecoal Fork (1800 ft msl) to its mouth is 34.6 miles, providing a slope for Beaver Creek of 34 ft/mile. Table 3.7 summarizes the elevation and slope information.

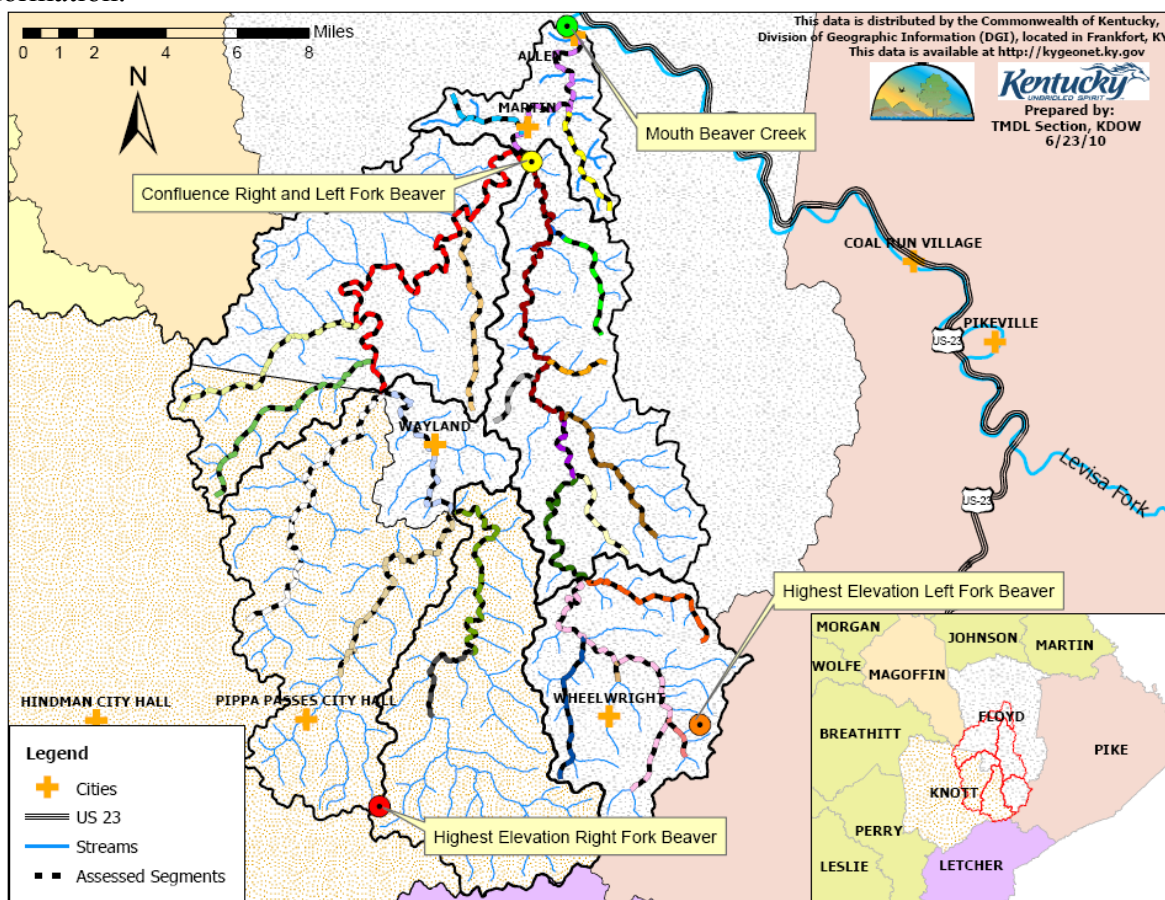


Figure 3.2 Stream Elevation Points Used to Determine Stream Slopes

Table 3.7 Beaver Creek Watershed Elevation and Slope

Stream	Highest Elevation	Lowest Elevation	Difference in Elevation	Length from Highest to Lowest	Slope
Left Fork Beaver	1800 ft Stonecoal Fork	639 ft Confluence of Left and Right Fork	1161 ft	27.5 miles	42.2 ft/mile
Right Fork Beaver	1556 ft Left Fork Holly Bush	639 ft Confluence of Left and Right Fork	917 ft	35.4 miles	25.9 ft/mile
Beaver Creek	1800 ft Stonecoal Fork	624 ft Mouth of Beaver	1176 ft	34.6 miles	34 ft/mile

Karst development is not expected in the Beaver Creek Watershed. Groundwater in this area is predominantly fracture flow through sandstone and some minor fracture-flow springs may occur. There is no reason to suspect groundwater flow that would deviate from the topographic hydrologic divides (KDOW, 2010b).

There are no active discharge gaging stations in the Beaver Creek watershed; however, a real-time precipitation gage, Price Precipitation Site # 372418082444201, is in operation on the Left Fork of Beaver Creek. Figure 3.3 shows the location of this precipitation gage in the watershed.

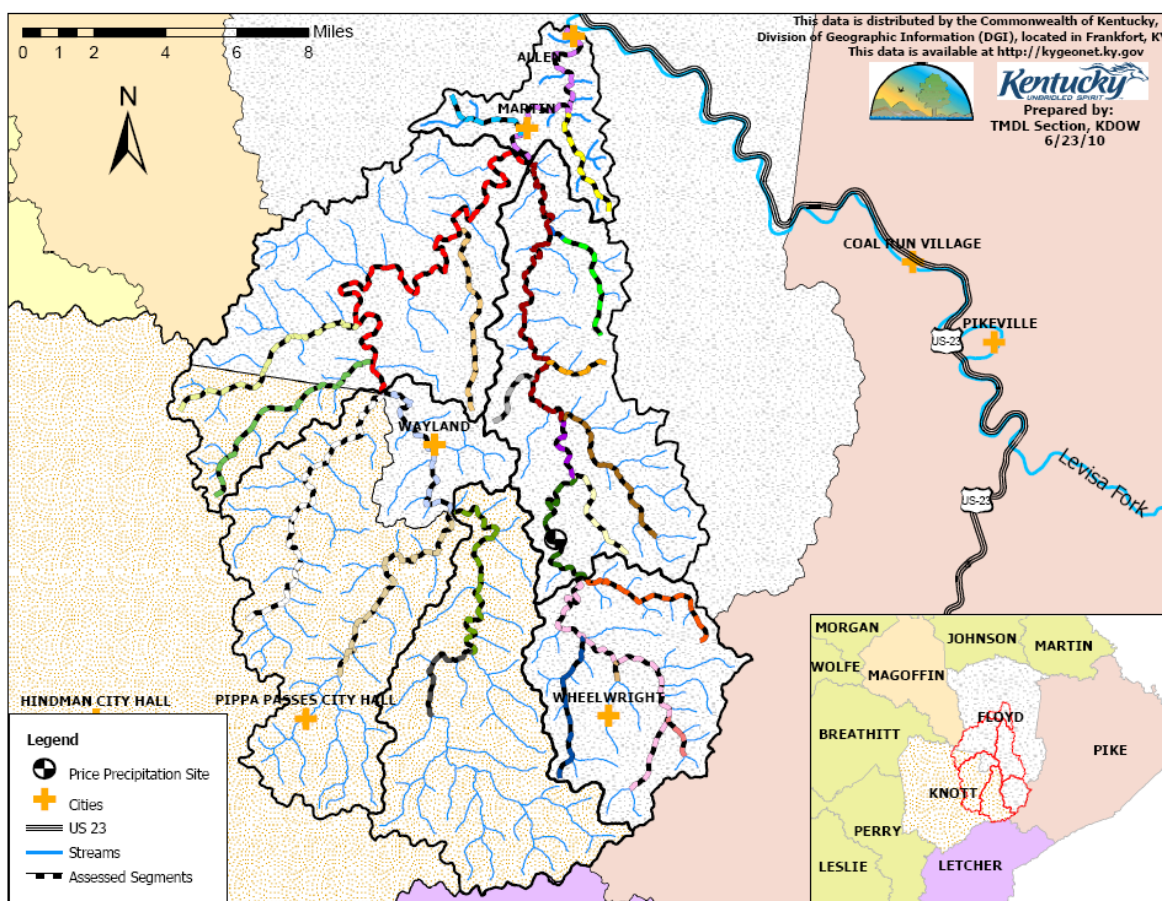


Figure 3.3 Location of Price Precipitation Gage on Left Fork Beaver Creek

There are nine water withdrawals permitted by KDOW in the Beaver Creek Watershed. Three of these are groundwater withdrawals, one is from a surface impoundment, and five are from streams. Table 3.8 displays KDOW water withdrawal permit information while Figure 3.4 shows the location and type of withdrawal. Information was obtained from the KDOW water withdrawal permits.

Table 3.8 Information for KDOW Permitted Water Withdrawals

AI #	Name	Latitude	Longitude	Withdrawal (MGD)	Withdrawal (cfs)	Source Description
1359	Wheelwright Utility Commission	37.32165	-82.73251	$\leq 0.350$	$\leq 0.54153$	Groundwater from Wheelwright Mine
2528	ICG Knott Co LLC (860-8012)	37.32166	-82.80366	$\leq 0.265$	$\leq 0.4100156$	River mile 40.6 of Right Fork Beaver Creek
2525	Deane Mining LLC (860-5318)	37.41038	-82.78096	$\leq 0.010$	$\leq 0.01547229$	River mile 31.0 of Right Fork Beaver Creek
100130	CONSOL of Kentucky Inc	37.43167	-82.89833	$\leq 0.384$	$\leq 0.5941358$	River mile 1.38 of Fourmile Branch impoundment off Jones Fork
44215	Knott Co Water District	37.35042	-82.86385	$\leq 0.144$	$\leq 0.2228009$	Field of seven groundwater wells along Caney Creek
1191	Francis Water Co	37.47522	-82.81634	Jan. & Feb. $\leq 0.062$ ; Mar $\leq 0.064$ ; Apr. & May $\leq 0.067$ ; Jun. $\leq 0.07$ ; Jul., Aug. & Sept. $\leq 0.073$ ; Oct $\leq 0.07$ ; Nov $\leq 0.066$ ; Dec $\leq 0.063$	$\leq 0.09592818$ to $\leq 0.1129477$	Groundwater from an abandoned mine
1299	Elk Horn Coal Co LLC	37.40129	-82.74175	$\leq 0.06$	$\leq 0.09283372$	River mile 15.36 of Left Fork Beaver Creek
3502	ICG Knott Co LLC	37.3884	-82.82856	$\leq 0.65$	$\leq 1.005699$	River mile 4.2 of Caney Creek
78571	Black Diamond Mining	37.53192	-82.74364	$\leq 0.432$	$\leq 0.6684028$	River mile 2.4 of Left Fork Beaver Creek



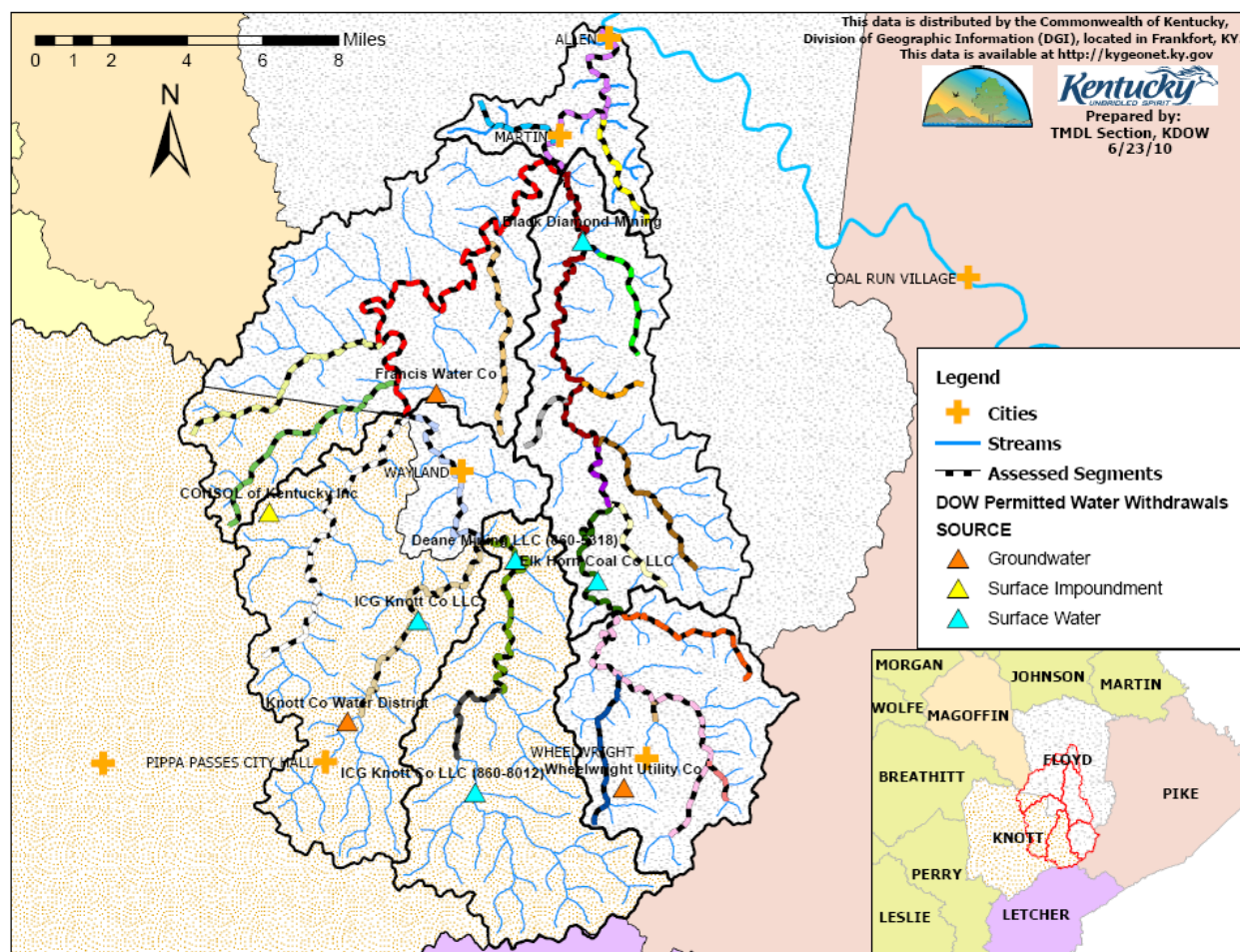


Figure 3.4 Location of KDOW Permitted Water Withdrawals in the Beaver Creek Watershed

### 3.3 Geology

The Beaver Creek watershed is underlain by Pennsylvanian rock, which developed 325 to 290 million years ago (KGS, 2010). These rocks consist of interbedded shale, sandstone, conglomerates, and coal (KGS, 2010). The major members of the Pennsylvanian rock in Eastern Kentucky are the Pennington and Lee formations and the overlying Breathitt, Conemaugh, and Monongahela formations (McDowell, 1986).

### 3.4 Soils

Information on soils was obtained from the U.S. Department of Agriculture Web Soil Survey. The major soil associations found in the watershed are the Hazleton-Feds creek-Marrowbone complex, the Dekalb-Gilpin-Marrowbone complex, the Hazleton-Feds creek-Kimper complex, the Sharondale-Hazleton-Kimper complex, the Feds creek-Shelocta-Handshoe complex, and the Cloverlick-Shelocta-Kimper complex. Tables 3.9 through 3.14 show the soil formations found in each of the six subwatersheds. Only soils that comprise at least 1% of the subwatershed total are shown; many lesser soils have been deleted. It should be noted that the above mentioned major

soil formations tend to be on the hillsides while the loams mentioned in the tables tend to be along the streams or in the floodplains.

Table 3.9 Beaver Creek Mainstem Subwatershed Soils

Soil Type	Acres in Watershed	Square Miles in Watershed	Percent of Soil Type in Watershed	Septic Tank Absorption Fields Rating	Sewage Lagoons Rating
Hazleton-Feds creek-Marrowbone complex, 30 to 80 percent slopes, very stony	2231	3.5	28.20	Very limited	Very limited
Dekalb-Gilpin-Marrowbone complex, 20 to 80 percent slopes, very stony	2184.8	3.4	27.60	Very limited	Very limited
Hazleton-Feds creek-Kimper complex, 30 to 80 percent slopes, very stony	993.8	1.6	12.60	Very limited	Very limited
Sharondale-Hazleton-Kimper complex, 30 to 80 percent slopes, extremely stony	800.2	1.3	10.10	Very limited	Very limited
Myra very channery fine sandy loam, 30 to 70 percent slopes, stony	374.6	0.6	4.70	Very limited	Very limited
Udorthents-Urban land complex, 0 to 15 percent slopes	315.1	0.5	4.00	Not rated	Not rated
Grigsby fine sandy loam, occasionally flooded	205.9	0.3	2.60	Very limited	Very limited
Potomac-Shelocta-Grigsby complex, 2 to 15 percent slopes	197.3	0.3	2.50	Very limited	Very limited
Allegheny loam, 2 to 6 percent slopes, occasionally flooded	166	0.3	2.10	Very limited	Very limited
Shelocta-Grigsby-Stokly complex, 2 to 15 percent slopes	147.9	0.2	1.90	Somewhat limited	Very limited
Fairpoint-Bethesda complex, 30 to 70 percent slopes, stony	112.1	0.2	1.40	Very limited	Very limited
Allegheny loam, 6 to 15 percent slopes, occasionally flooded	76.5	0.1	1.00	Very limited	Very limited

Table 3.10 Lower Left Fork Beaver Creek Subwatershed Soils

Soil Name	Acres in Watershed	Square Miles in Watershed	Percent of Soil Type in Watershed	Septic Tank Absorption Fields Rating	Sewage Lagoons Rating
Sharondale-Hazleton-Kimper complex, 30 to 80 percent slopes, extremely stony	7986.4	12.5	30.51	Very limited	Very limited
Hazleton-Fedscreek-Marrowbone complex, 30 to 80 percent slopes, very stony	7613	11.9	29.09	Very limited	Very limited
Dekalb-Gilpin-Marrowbone complex, 20 to 80 percent slopes, very stony	7087.4	11.1	27.08	Very limited	Very limited
Grigsby fine sandy loam, occasionally flooded	1076.8	1.7	4.11	Very limited	Very limited
Myra very channery fine sandy loam, 30 to 70 percent slopes, stony	600.9	0.9	2.30	Somewhat limited	Very limited
Udorthents-Urban land complex, 0 to 15 percent slopes	494.5	0.8	1.89	Very limited	Very limited
Potomac-Shelocta-Grigsby complex, 2 to 15 percent slopes	395.1	0.6	1.51	Very limited	Very limited

Table 3.11 Upper Left Fork Beaver Creek Subwatershed Soils

Soil Name	Acres in Watershed	Square Miles in Watershed	Percent of Soil Type in Watershed	Septic Tank Absorption Fields Rating	Sewage Lagoons Rating
Sharondale-Hazleton-Kimper complex, 30 to 80 percent slopes, extremely stony	6707	10.5	34.76	Very limited	Very limited
Dekalb-Gilpin-Marrowbone complex, 20 to 80 percent slopes, very stony	5792.4	9.1	30.02	Very limited	Very limited
Hazleton-Fedscreek-Marrowbone complex, 30 to 80 percent slopes, very stony	5116	8.0	26.51	Very limited	Very limited
Potomac-Shelocta-Grigsby complex, 2 to 15 percent slopes	878.3	1.4	4.55	Very limited	Very limited
Udorthents-Urban land complex, 0 to 15 percent slopes	298.6	0.5	1.55	Not rated	Not rated

Table 3.12 Lower Right Fork Beaver Creek Subwatershed Soils

Soil Name	Acres in Watershed	Square Miles in Watershed	Percent of Soil Type in Watershed	Septic Tank Absorption Fields Rating	Sewage Lagoons Rating
Dekalb-Gilpin-Marrowbone complex, 20 to 80 percent slopes, very stony	9080.1	14.2	26.42	Very limited	Very limited
Hazleton-Fedscreek-Marrowbone complex, 30 to 80 percent slopes, very stony	8611.2	13.5	25.05	Very limited	Very limited
Hazleton-Fedscreek-Kimper complex, 30 to 80 percent slopes, very stony	4536.5	7.1	13.20	Very limited	Very limited
Sharondale-Hazleton-Kimper complex, 30 to 80 percent slopes, extremely stony	2834.7	4.4	8.25	Very limited	Very limited
Cloverlick-Shelocta-Kimper complex, 20 to 70 percent slopes, stony	2341.8	3.7	6.81	Very limited	Very limited
Fedscreek-Shelocta-Handshoe complex, 30 to 80 percent slopes, very stony	1994.9	3.1	5.80	Very limited	Very limited
Grigsby fine sandy loam, occasionally flooded	1098.1	1.7	3.19	Very limited	Very limited
Shelocta-Grigsby-Stokly complex, 2 to 15 percent slopes	984.8	1.5	2.87	Somewhat limited	Very limited
Udorthents-Urban land complex, 0 to 15 percent slopes	657.3	1.0	1.91	Not rated	Not rated
Fedscreek-Shelocta complex, 20 to 50 percent slopes	460	0.7	1.34	Very limited	Very limited
Udorthents-Urban land complex, steep	401	0.6	1.17	Not rated	Not rated
Potomac-Shelocta-Grigsby complex, 2 to 15 percent slopes	379.3	0.6	1.10	Very limited	Very limited



Table 3.13 Middle Right Fork Beaver Creek Subwatershed Soils

Soil Name	Acres in Watershed	Square Miles in Watershed	Percent of Soil Type in Watershed	Septic Tank Absorption Fields Rating	Sewage Lagoons Rating
Fedscreek-Shelocta-Handshoe complex, 30 to 80 percent slopes, very stony	10278.7	16.1	27.91	Very limited	Very limited
Cloverlick-Shelocta-Kimper complex, 20 to 70 percent slopes, stony	10107.1	15.8	27.44	Very limited	Very limited
Dekalb-Gilpin-Marrowbone complex, 20 to 80 percent slopes, very stony	9273.1	14.5	25.18	Very limited	Very limited
Hazleton-Fedscreek-Marrowbone complex, 30 to 80 percent slopes, very stony	2151.9	3.4	5.84	Very limited	Very limited
Sharondale-Hazleton-Kimper complex, 30 to 80 percent slopes, extremely stony	2025	3.2	5.50	Very limited	Very limited
Urban land-Udorthents-Grigsby complex, 0 to 6 percent slopes, rarely flooded	568.6	0.9	1.54	Not rated	Not rated
Kaymine, Fairpoint, and Fiveblock soils, benched, 2 to 70 percent slopes, very stony	547.6	0.9	1.49	Very limited	Very limited
Grigsby sandy loam, occasionally flooded	493.2	0.8	1.34	Very limited	Very limited

Table 3.14 Upper Right Fork Beaver Creek Subwatershed Soils

Soil Name	Acres in Watershed	Square Miles in Watershed	Percent of Soil Type in Watershed	Septic Tank Absorption Fields Rating	Sewage Lagoons Rating
Feds creek-Shelocta-Handshoe complex, 30 to 80 percent slopes, very stony	10567.5	16.5	37.30	Very limited	Very limited
Cloverlick-Shelocta-Kimper complex, 20 to 70 percent slopes, stony	8161.9	12.8	28.81	Very limited	Very limited
Dekalb-Gilpin-Marrowbone complex, 20 to 80 percent slopes, very stony	7185.5	11.2	25.36	Very limited	Very limited
Rowdy-Grigsby complex, 0 to 4 percent slopes, occasionally flooded	728.9	1.1	2.57	Very limited	Very limited
Kaymine, Fairpoint, and Fiveblock soils, benched, 2 to 70 percent slopes, very stony	722.2	1.1	2.55	Very limited	Very limited
Grigsby-Urban land complex, 0 to 6 percent slopes, occasionally flooded	426.7	0.7	1.51	Very limited	Very limited
Urban land-Udorthents-Grigsby complex, 0 to 6 percent slopes, rarely flooded	294.2	0.5	1.04	Not rated	Not rated

### **3.5 Land Cover Distribution**

The 2001 National Land Cover Dataset (USGS 2003) was used to determine the land cover within the Beaver Creek watershed. The 2001 NLCD Land Cover Class Definitions are in Appendix A. Tables 3.15 through 3.20 describe the land cover by class within the subwatershed areas. For the land cover tables, all forms of developed area (i.e., high-, medium- and low-intensity developed area, as well as developed open space), were aggregated, as were all forms of forest. This was done to simplify the source analysis. Land cover is also shown graphically in Figures 3.5 through 3.10 for each of the six subwatersheds.

The land cover figures and tables indicate that the majority of the Beaver Creek watershed is forested with little agriculture or development. The land cover figures also show that much of the developed area occurs along the streams and floodplains as opposed to the forested hillsides. The barren class includes active surface mines while reclaimed mine sites are in the grassland/herbaceous class.

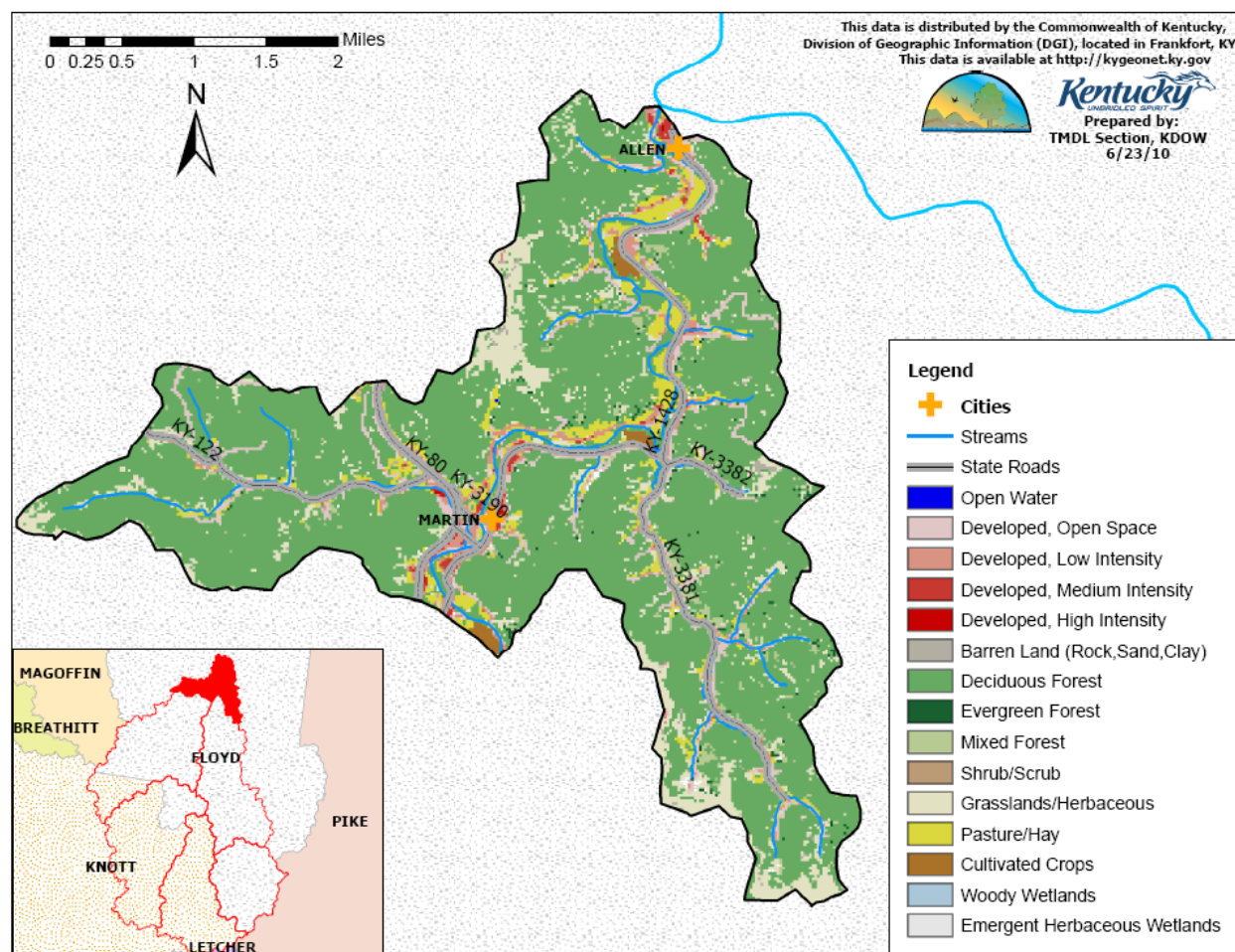


Figure 3.5 Land Cover in the Beaver Creek Mainstem Subwatershed

Table 3.15 Beaver Creek Mainstem Subwatershed Land Cover

Land Cover		Square Miles	% of Total Area
Forest		8.91	73.15
Developed		1.24	10.19
Grassland/ Herbaceous		1.16	9.49
Agriculture (total)		0.79	6.49
	Pasture/ Hay	0.70	5.75
	Cultivated Crops	0.09	0.74
Barren		0.05	0.44
Shrubland		0.03	0.26
Wetlands		0.00	0.03
Open Water		0.00	0.01
<b>Total</b>		12.18	

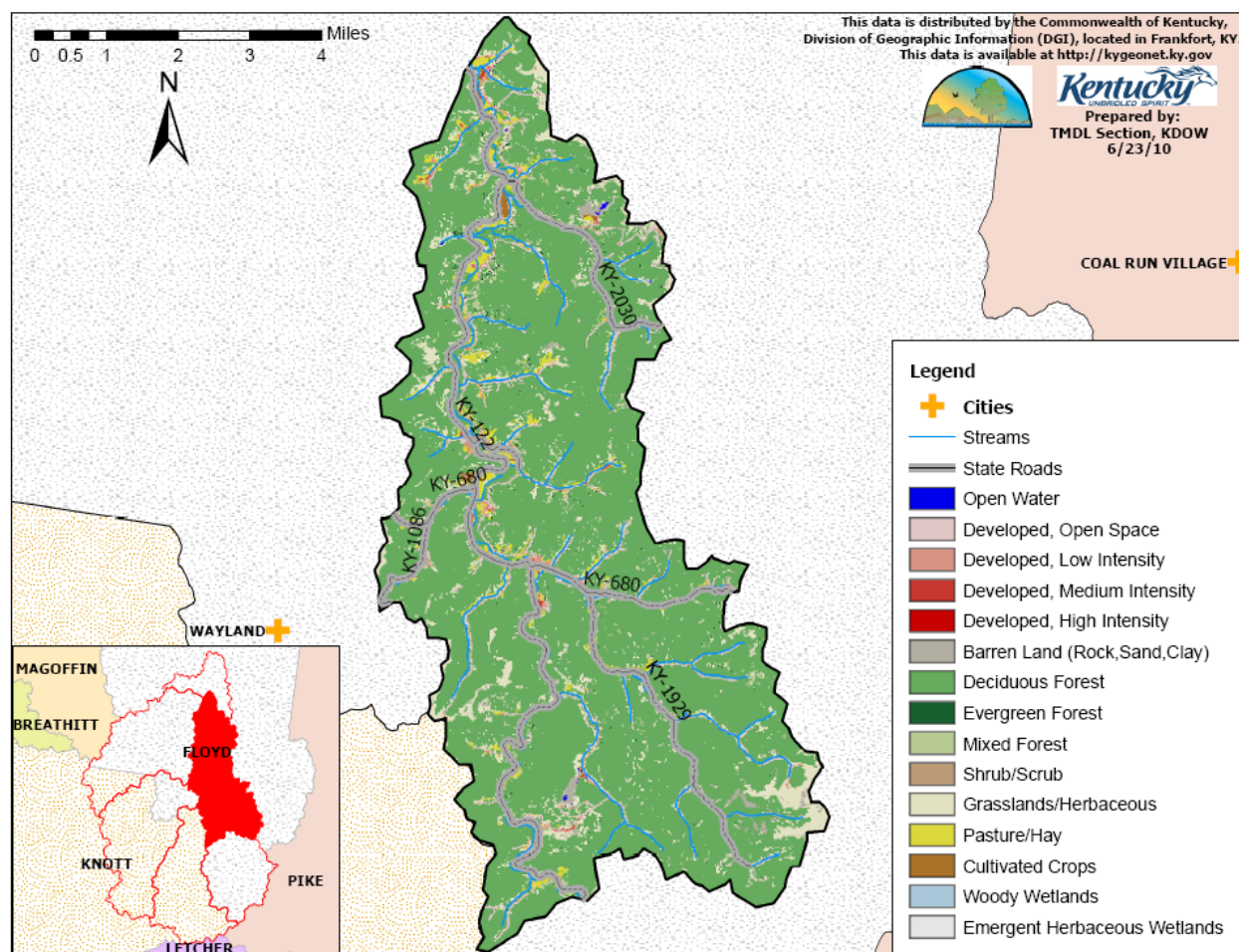


Figure 3.6 Land Cover in the Lower Left Fork Beaver Creek Subwatershed

Table 3.16 Lower Left Fork Beaver Creek Subwatershed Land Cover

Land Cover		Square Miles	% of Total Area
Forest		34.32	79.77
Developed		2.96	6.87
Grassland/ Herbaceous		3.48	8.10
Agriculture (total)		1.67	3.9
	Pasture/ Hay	1.56	3.64
	Cultivated Crops	0.11	0.25
Barren		0.49	1.14
Shrubland		0.08	0.18
Wetlands		0.01	0.02
Open Water		0.02	0.05
<b>Total</b>		43.02	



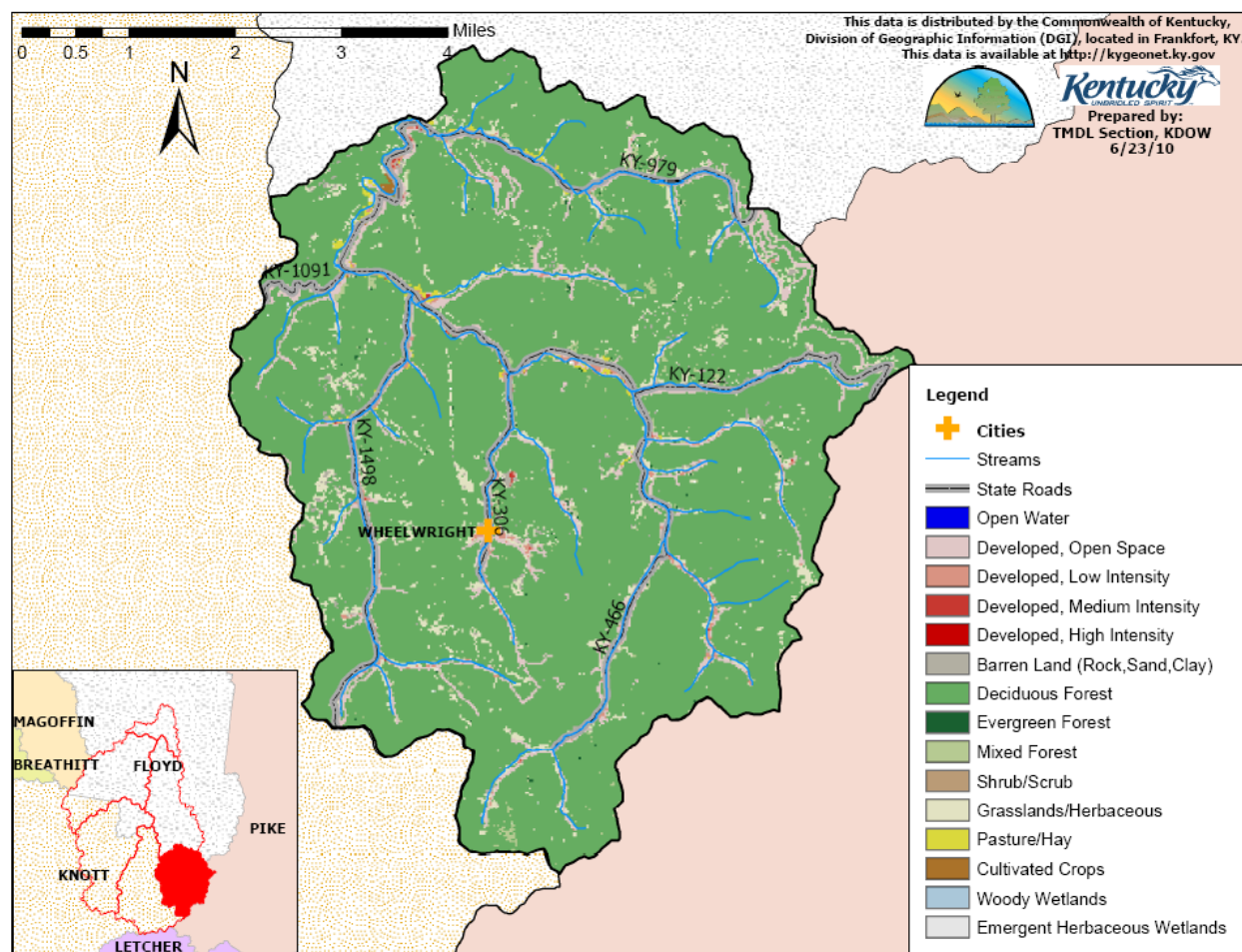


Figure 3.7 Land Cover in the Upper Left Fork Beaver Creek Subwatershed

Table 3.17 Upper Left Fork Beaver Creek Subwatershed Land Cover

Land Cover		Square Miles	% of Total Area
Forest		26.27	85.87
Developed		2.08	6.80
Grassland/ Herbaceous		1.62	5.30
Agriculture (total)		0.32	1.05
	Pasture/ Hay	0.28	0.93
	Cultivated Crops	0.04	0.12
Barren		0.27	0.89
Shrubland		0.03	0.09
Wetlands		0.00	0.00
Open Water		0.00	0.00
<b>Total</b>		<b>30.60</b>	

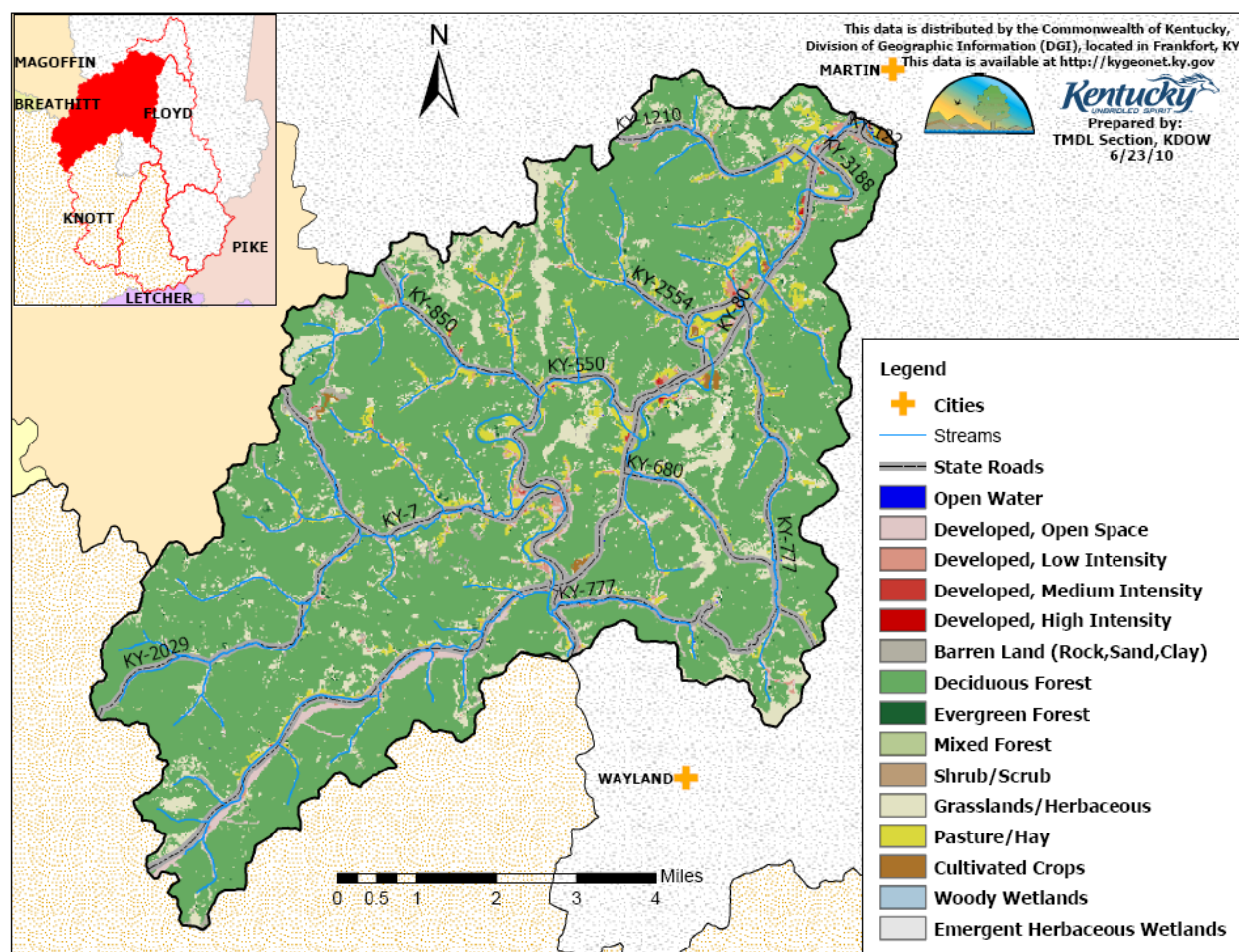


Figure 3.8 Land Cover in the Lower Right Fork Beaver Creek Subwatershed

Table 3.18 Lower Right Fork Beaver Creek Subwatershed Land Cover

Land Cover		Square Miles	% of Total Area
Forest		41.13	74.99
Developed		4.24	7.73
Grassland/ Herbaceous		5.88	10.73
Agriculture (total)		3.07	5.59
	Pasture/ Hay	2.88	5.24
	Cultivated Crops	0.19	0.34
Barren		0.38	0.69
Shrubland		0.13	0.24
Wetlands		0.01	0.03
Open Water		0.00	0.01
<b>Total</b>		54.85	



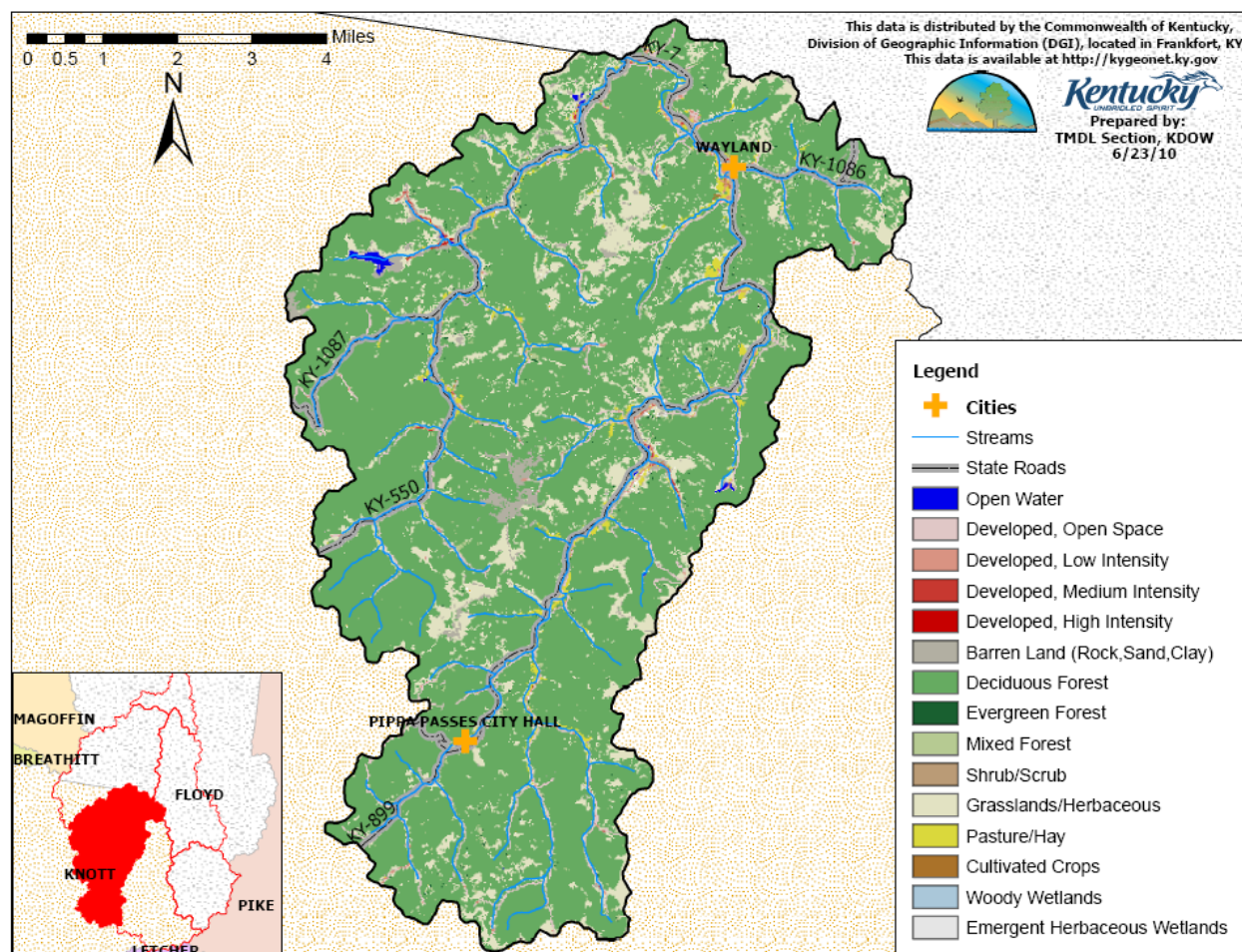


Figure 3.9 Land Cover in the Middle Right Fork Beaver Creek Subwatershed

Table 3.19 Middle Right Fork Beaver Creek Subwatershed Land Cover

Land Cover		Square Miles	% of Total Area
Forest		45.17	78.27
Developed		2.80	4.85
Grassland/ Herbaceous		7.33	12.71
Agriculture (total)		1.20	2.08
	Pasture/ Hay	1.15	1.99
	Cultivated Crops	0.05	0.08
Barren		0.99	1.72
Shrubland		0.11	0.20
Wetlands		0.01	0.01
Open Water		0.10	0.17
<b>Total</b>		<b>57.71</b>	

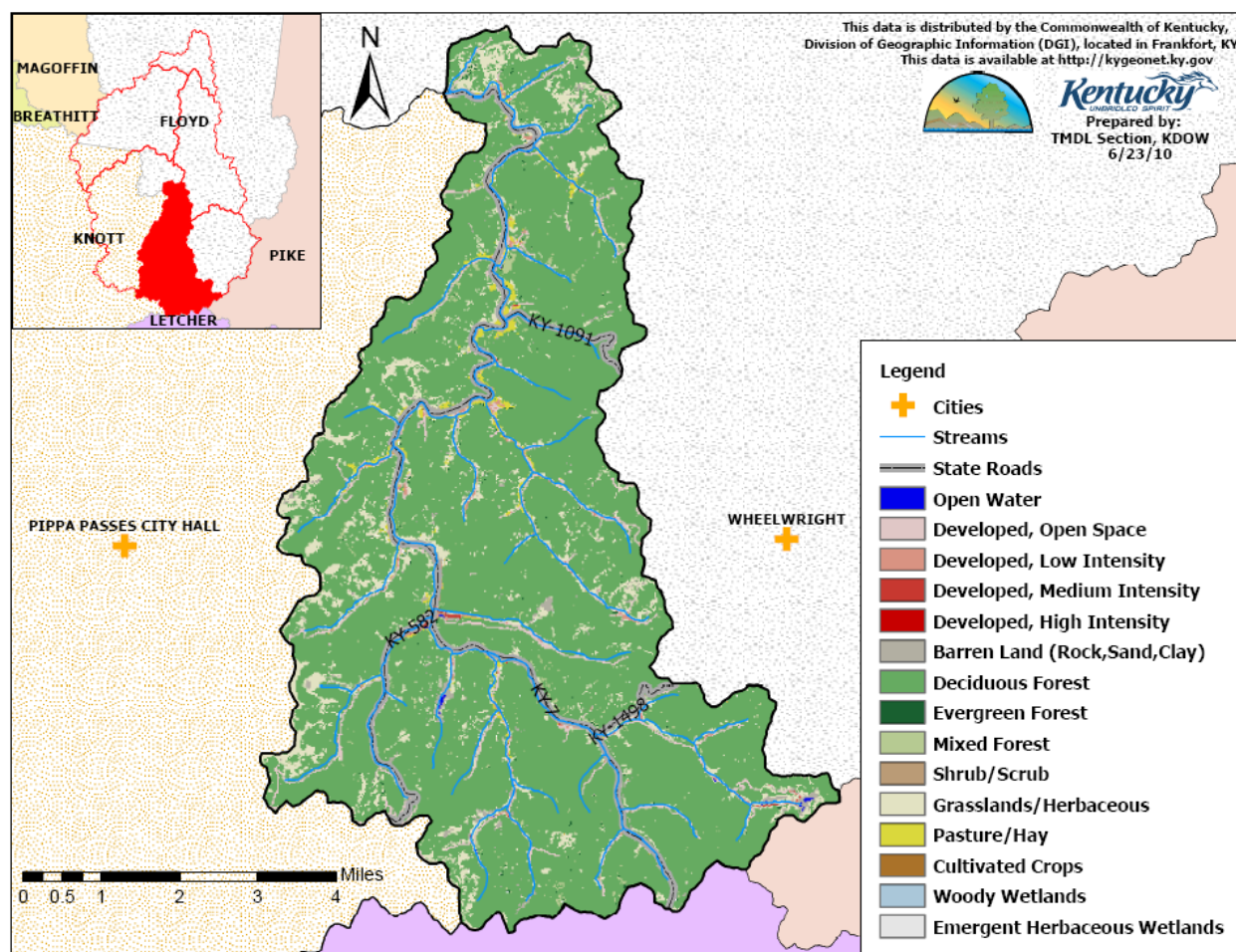


Figure 3.10 Land Cover in the Upper Right Fork Beaver Creek Subwatershed

Table 3.20 Upper Right Fork Beaver Creek Subwatershed Land Cover

Land Cover		Square Miles	% of Total Area
Forest		35.23	82.97
Developed		2.24	5.29
Grassland/ Herbaceous		3.68	8.68
Agriculture (total)		0.71	1.66
	Pasture/ Hay	0.68	1.61
	Cultivated Crops	0.02	0.05
Barren		0.52	1.23
Shrubland		0.06	0.13
Wetlands		0.00	0.00
Open Water		0.02	0.04
<b>Total</b>		42.46	



#### 4.0 Pathogen Indicator Monitoring Data

In 1997, Kentucky adopted a Watershed Management Framework under which monitoring is targeted in a specific basin unit during a specified year. Monitoring began with the Kentucky River Basin during 1998, then the Salt/Licking Basin in 1999, the Cumberland/ Mississippi/Ohio/Tennessee in 2000, the Green/Tradewater in 2001, and the Big Sandy/Little Sandy/Tygarts in 2002. This first cycle of monitoring focused on obtaining a snapshot of conditions of Kentucky's waters, especially Wadeable streams. The second cycle of the Watershed Framework schedule again began with the Kentucky Basin in 2004 and ended with the Sandy/Little/Sandy/Tygarts in 2007. This second cycle of monitoring focused on impaired watersheds; however, monitoring for other purposes was also conducted. KDOW has several monitoring programs to monitor biological and water quality indicators, which are highlighted in Table 4.1. Details about the programs can be found in the 2008 Integrated Report to Congress on Water Quality in Kentucky Volume 1, 305(b) Report (KDOW, 2008b).

Table 4.1 KDOW Monitoring Programs

	Long-term Surface Water (a)	Rotating Surface Water (a)	Targeted Biological Monitoring (b, c)	Reference Reach (b)	Probabilistic Biosurvey (d)	Lake monitoring (e)	Ground-water & Springs Monitoring (a)
Streams (1st-5th order)		X	X	X	X		
Large Rivers	X	X	X				
Lakes/Reservoirs						X	
Groundwater							X

(a) Indicators: physicochemical and pathogen indicator

(b) Indicators: macroinvertebrates, fish, algae, physicochemical, habitat

(c) Includes some 6<sup>th</sup> order streams where Wadeable and associated with ambient water quality stations

(d) Indicators: macroinvertebrates, physicochemical, habitat

(e) Indicators: physicochemical, fish kills, macrophytes, algae

The PCR use for pathogens can initially be monitored and assessed under three different programs, Long-term Surface Water, Rotating Surface Water, or Groundwater and Springs Monitoring. Under the Kentucky Watershed Management Framework, Long-term stations are fixed, permanent sampling sites located in the downstream and mid-unit reaches of USGS 8-digit HUCs, upstream of major reservoirs and in the downstream reaches of major tributaries. The long-term stations of a watershed management unit are sampled monthly during the year the unit is in the monitoring phase of the watershed cycle. During the other four years of the watershed cycle, sampling frequency is reduced to bimonthly. The Beaver Creek watershed has one Long-term station (PRI095) located at RM 1.3 of Beaver Creek. Rotating watershed stations are selected for intensive monthly sampling for one year during the monitoring portion of the five-year watershed cycle. These are usually located at the downstream reaches of USGS 11-digit HUC watersheds, and many were coupled with biological sampling and with USGS gauging stations. Groundwater and Springs Monitoring is performed as needed. Once a segment is identified as impaired, monitoring for TMDL development may be performed. TMDL monitoring sites are typically located in the initial impaired segment(s) and areas upstream of and major tributaries to these segments. KDOW follows water quality sample collection and

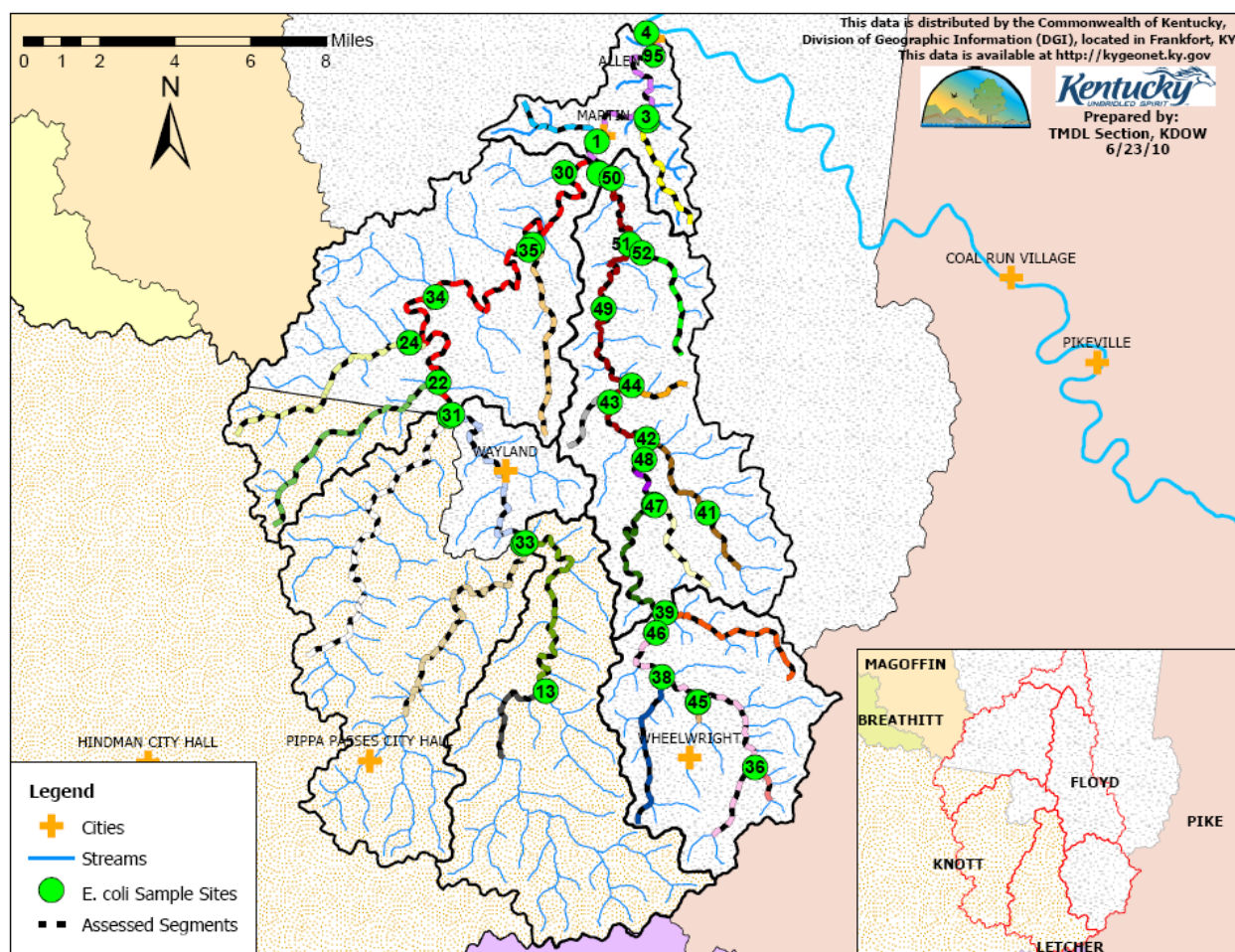
preservation procedures found in its water quality monitoring standard operating procedures (KDOW, 2005b).

#### **4.1 Historical Monitoring**

Beaver Creek RM 0.0 to 7.1 was initially listed as nonsupport of the PCR use due to pathogens on the 2004 303(d) list. This listing was due in part to discharge monitoring reports (DMRs) from the Martin Sewage Treatment Plant. The Right Fork of Beaver Creek was not listed during 2004 but was indicated to be threatened for the PCR use. The 2004 listing for Beaver Creek was carried forward to the 2006 303(d) list when the Right Fork of Beaver Creek from RM 0.0 to 17.4 was also listed as nonsupport for pathogens. During the 2008 listing cycle, these pathogen listings were more correctly identified with the indicator organism used; in this case fecal coliform.

#### **4.2 TMDL Monitoring**

To obtain information for TMDL development, KDOW contracted with Eastern Kentucky University (EKU) to collect E. coli data at 33 sites in the Beaver Creek watershed during the 2007 and 2008 PCR season (Figure 4.1). This sampling was performed by the students and staff of the Eastern Kentucky Environmental Research Institute at EKU under the direction of Dr. Alice Jones and Environmental Specialist Reagan Butcher. The assessment results from this monitoring effort indicated that many additional stream segments within the watershed were impaired for the PCR use due to the pathogen indicator E. coli. On the draft 2010 list, these additional segments were listed for E. coli and the previously mentioned segments were carried forward, resulting in the 22 proposed listings shown in Table 4.2. To show greater detail, Figures 4.2 through 4.7 display the sample sites by subwatershed. The E. coli data submitted by Eastern Kentucky University, along with data from the Long-term site PRI095 is shown in Appendix B.

Figure 4.1 *E. coli* Sample Sites in the Beaver Creek Watershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, Site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45 and site 40 is under site 47.

Table 4.2 Proposed Pathogen Indicator Impaired Segments in Beaver Creek Watershed

Waterbody & Segment	County	Support Status	Use	Pollutant	Suspected Source(s)
Arkansas Creek 0.0 to 3.6	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Beaver Creek 0.0 to 7.1	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	Municipal (Urbanized High Density Area), On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges, Unspecified Domestic Waste
Buck Branch 0.0 to 2.8	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Caleb Fork 0.0 to 1.2	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)

Waterbody & Segment	County	Support Status	Use	Pollutant	Suspected Source(s)
Caney Fork 0.0 to 7.5	Knott	Nonsupport	PCR	<u>Escherichia coli</u>	Package Plant or Other Permitted Small Flows Discharges
Clear Creek 0.0 to 4.9	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Frasure Creek 0.0 to 5.2	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Jacks Creek 0.0 to 4.4	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Jones Fork 0.0 to 9.9	Knott	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Left Fork Beaver Creek 0.0 to 11.4	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Left Fork Beaver Creek 11.4 to 13.55	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Left Fork Beaver Creek 18.7 to 28.6	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Otter Creek 0.0 to 0.5	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	Package Plant or Other Permitted Small Flows Discharges
Right Fork Beaver Creek 0.0 to 17.4	Floyd	Nonsupport	PCR, SCR	<u>Escherichia coli</u> , Fecal coliform	Inappropriate Waste Disposal
Right Fork Beaver Creek 17.4 to 23.3	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Right Fork Beaver Creek 30.3 to 33.4	Knott	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems), Package Plant or Other Permitted Small Flows Discharges
Salt Lick Creek 0.0 to 6.8	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Simpson Branch 0.0 to 1.8	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Sizemore Branch 0.0 to 2.0	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Spewing Camp Branch 0.0 to 3.1	Floyd	Partial Support	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Spurlock Creek 0.0 to 0.6	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)
Turkey Creek 0.0 to 5.9	Floyd	Nonsupport	PCR	<u>Escherichia coli</u>	On-Site Treatment Systems (Septic Systems and Similar Decentralized Systems)

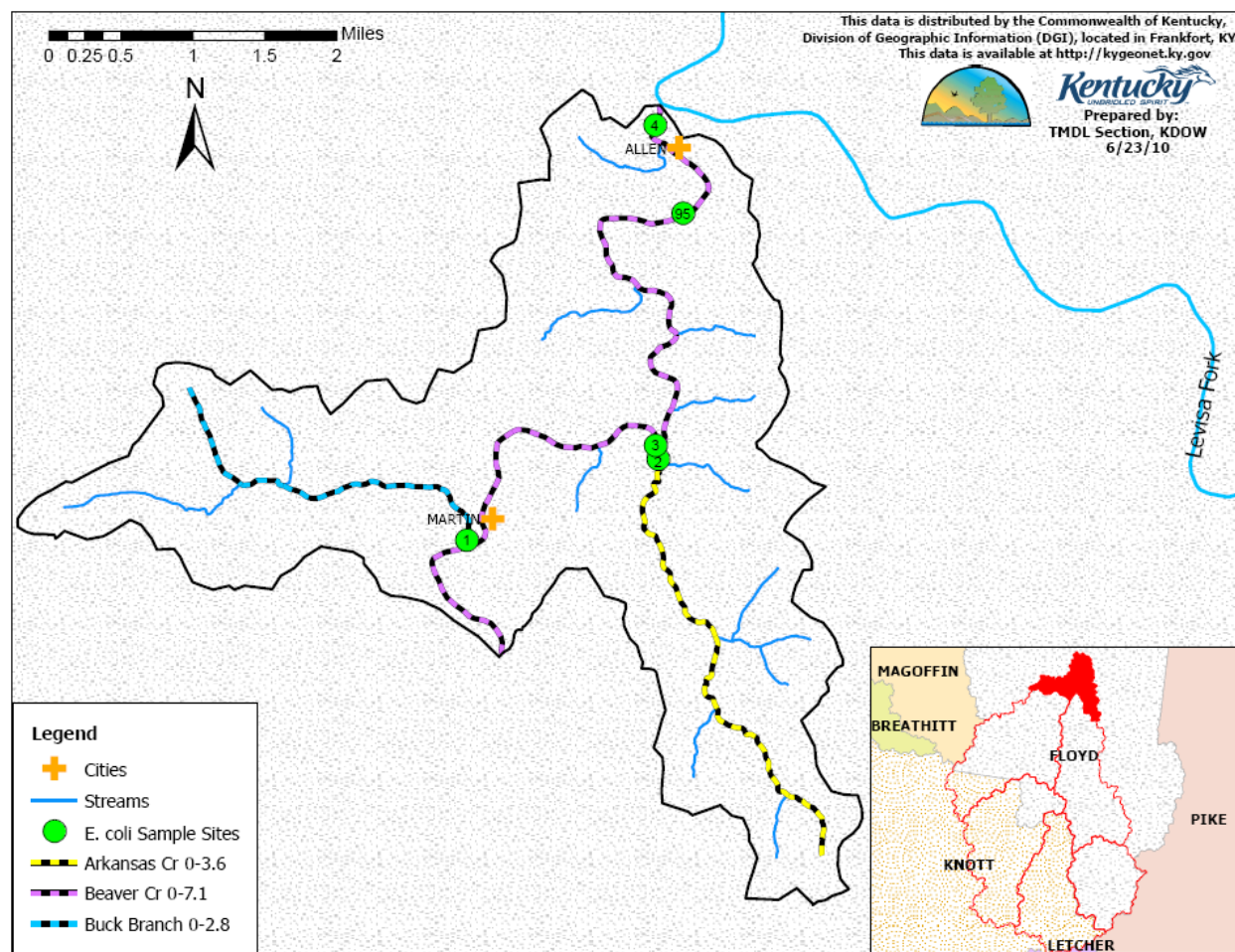


Figure 4.2 Assessed Segments and E. coli Sample Sites in the Beaver Creek Mainstem Subwatershed



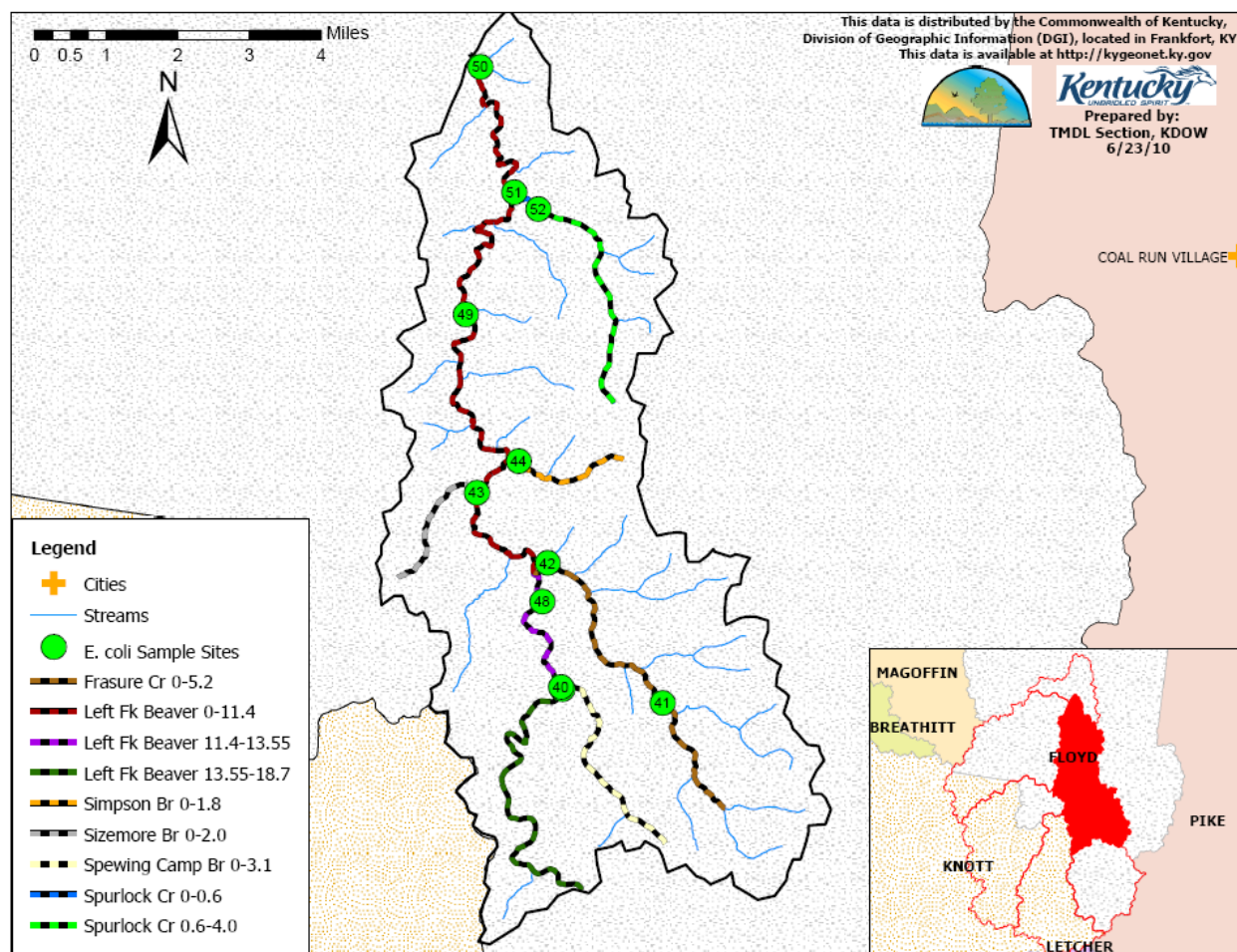


Figure 4.3 Assessed Segments and *E. coli* Sample Sites in the Lower Left Fork Beaver Creek Subwatershed.

Note: Spurlock Creek 0.0 to 0.6 is between sites 51 and 52. Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

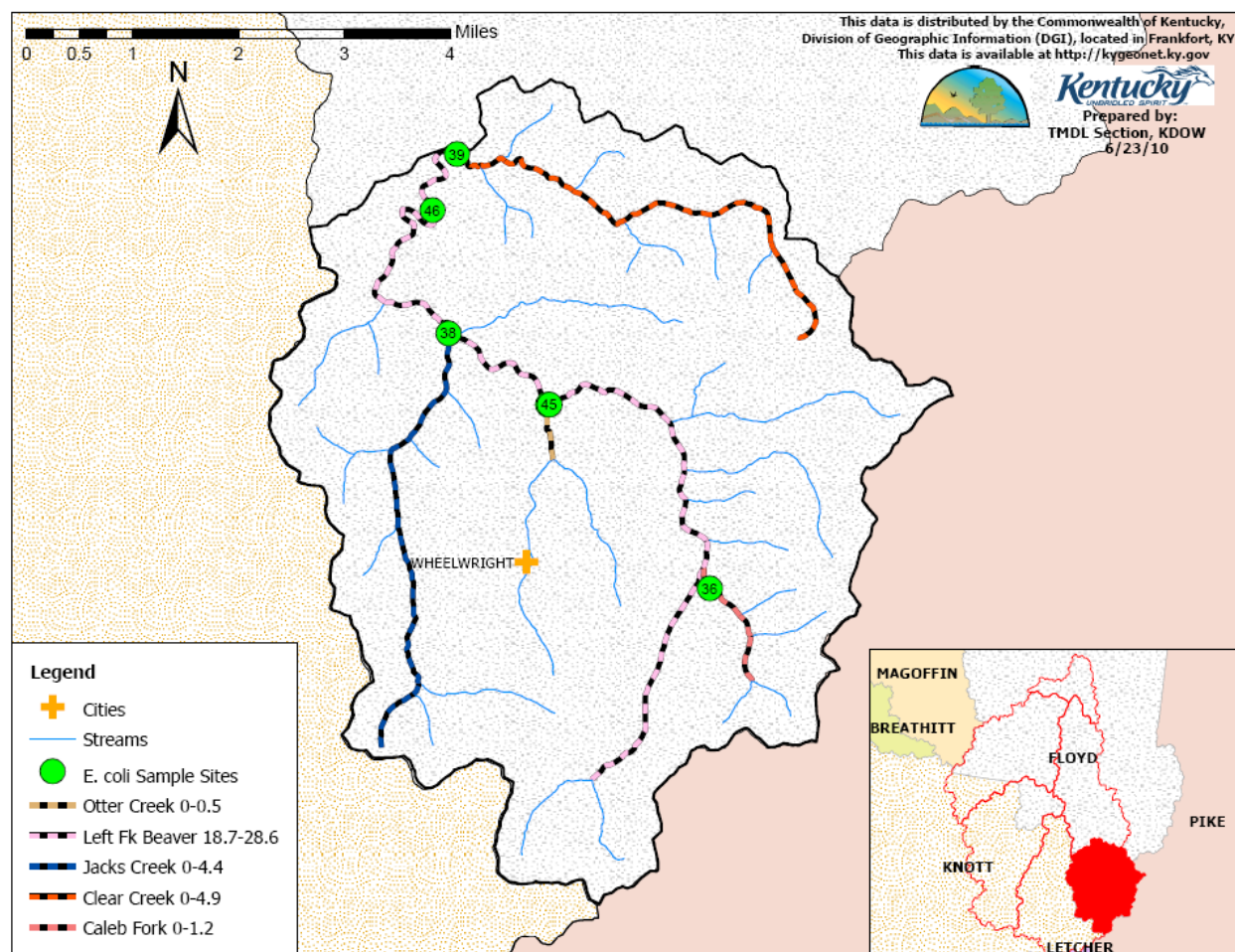


Figure 4.4 Assessed Segments and *E. coli* Sample Sites in the Upper Left Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

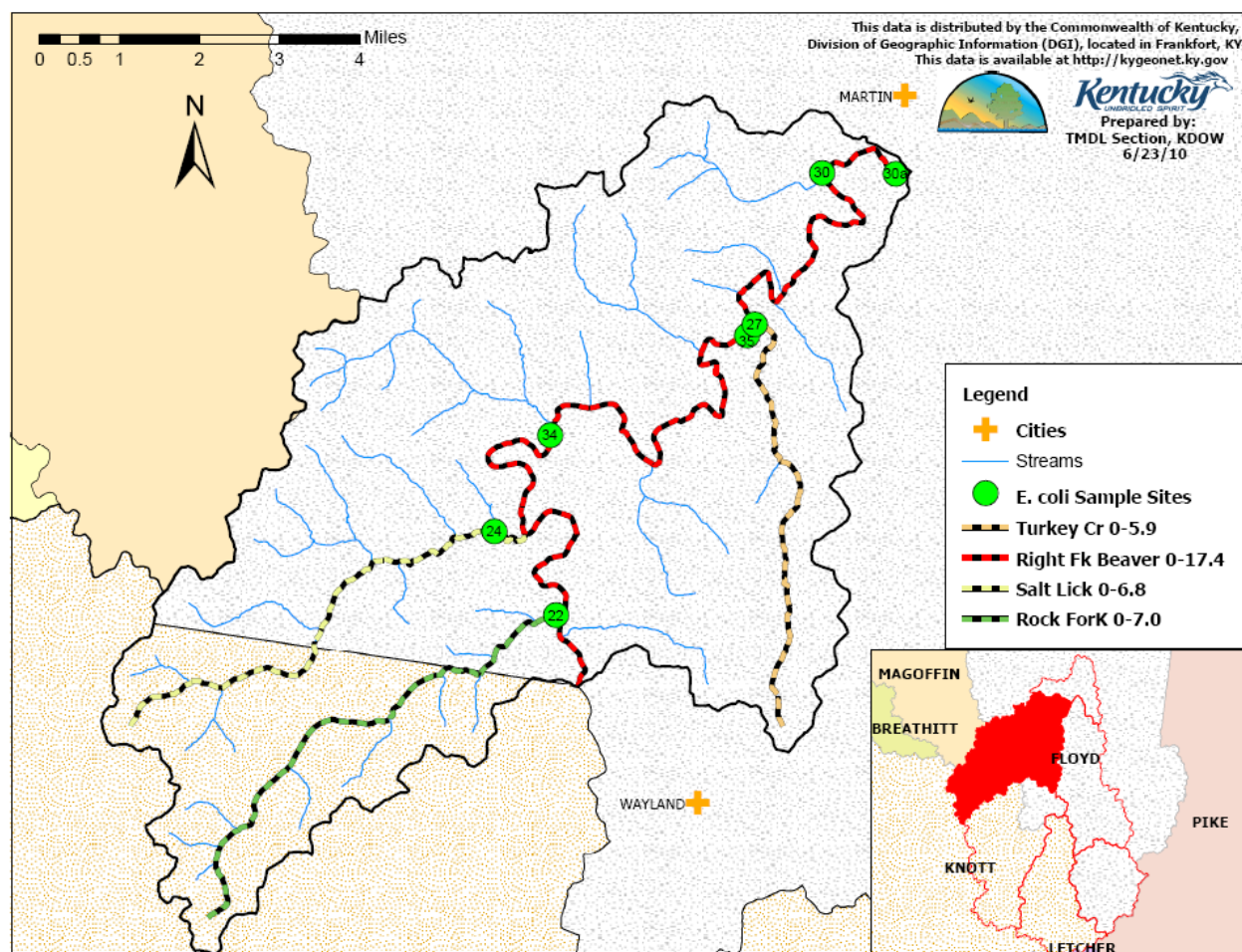


Figure 4.5 Assessed Segments and E. coli Sample Sites in the Lower Right Fork Beaver Creek Subwatershed



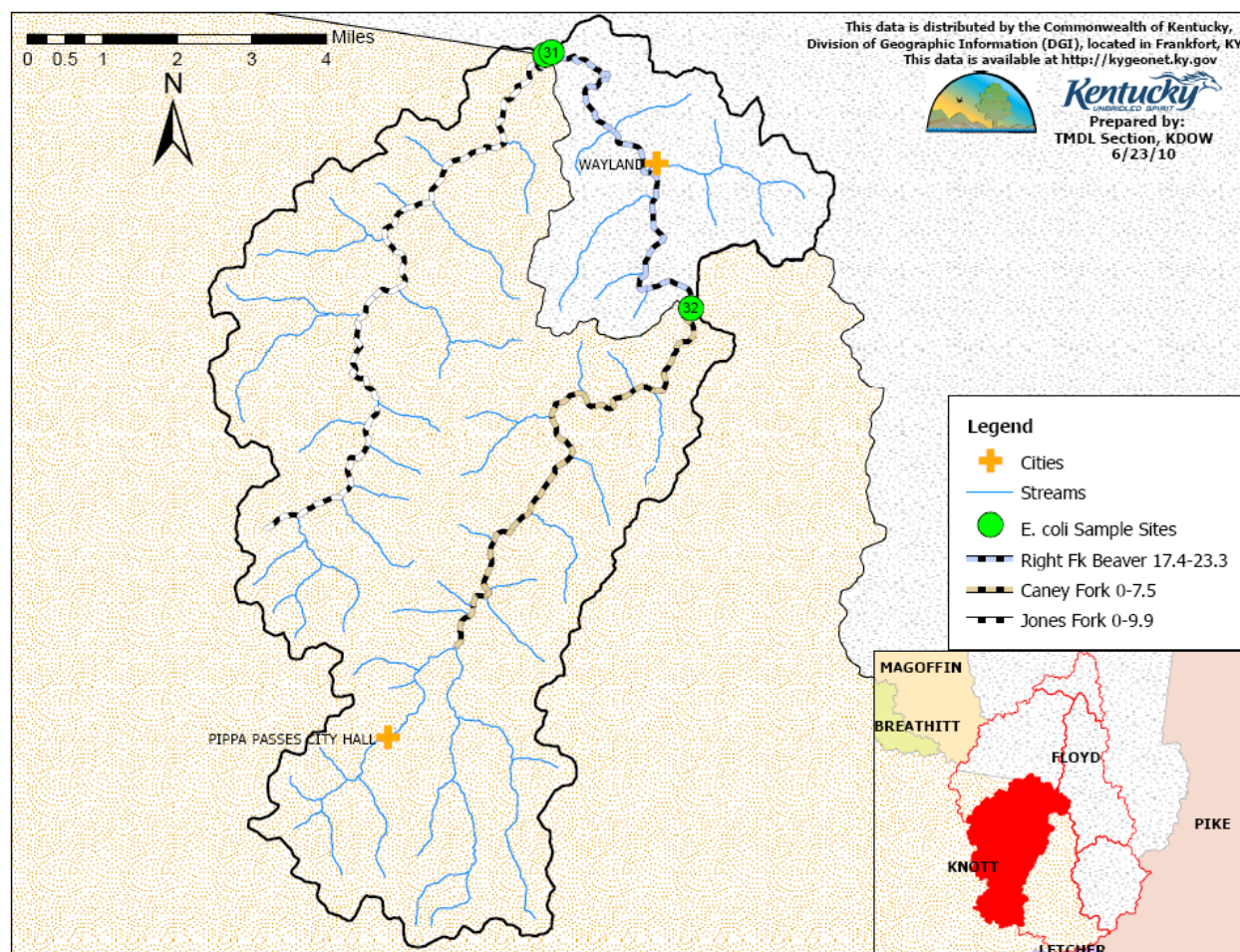


Figure 4.6 Assessed Segments and E. coli Sample Sites in the Middle Right Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 20 is under site 31.

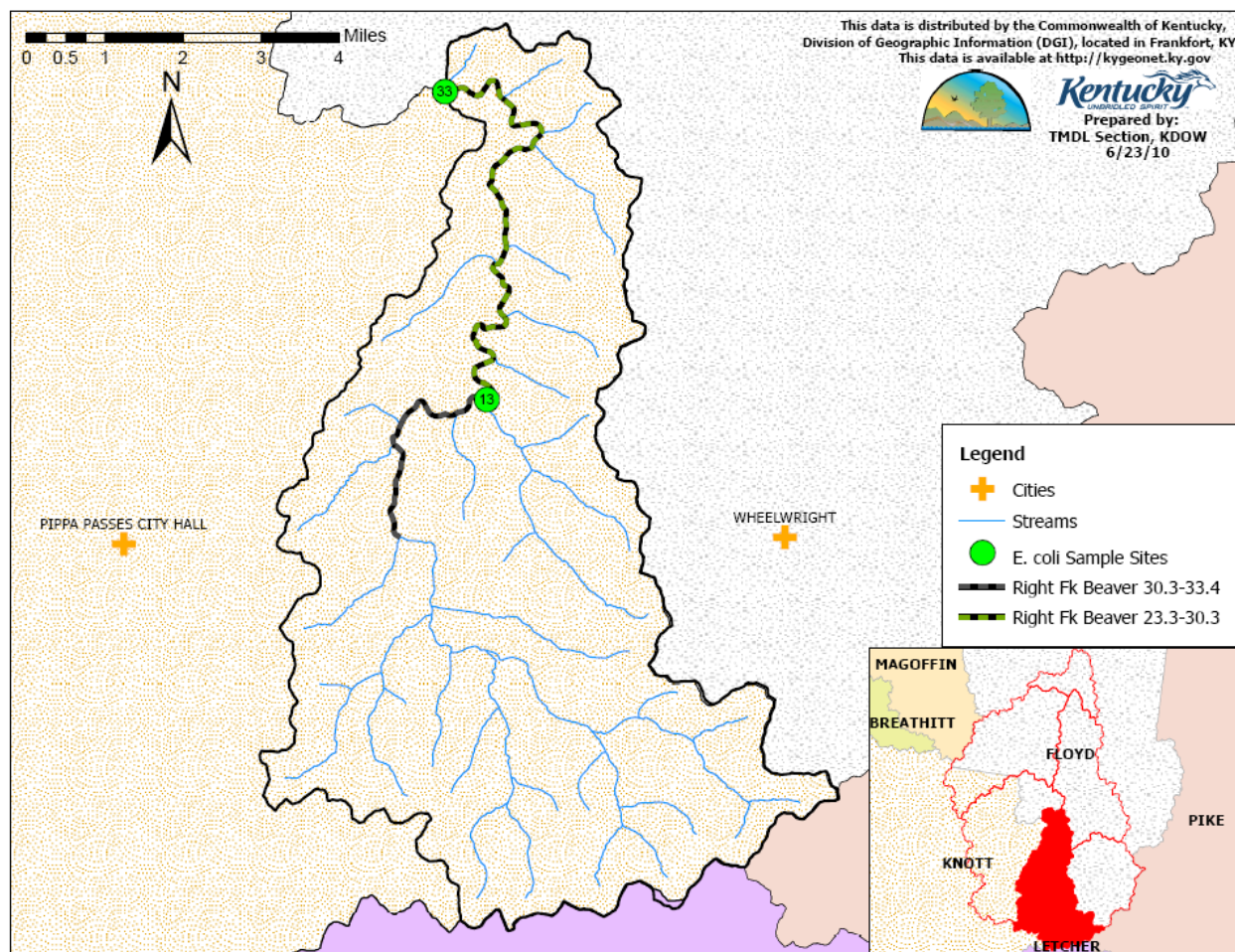


Figure 4.7 Assessed Segments and E. coli Sample Sites in the Upper Right Fork Beaver Creek Subwatershed

## **5.0 Source Analysis**

For regulatory purposes, the sources of E. coli in a watershed can be placed into two broad categories: KPDES-permitted and non KPDES-permitted sources. A KPDES-permitted source requires a Kentucky Pollutant Discharge Elimination System (KPDES) discharge permit, a Storm Water permit, or a Municipal Separate Storm Sewer System (MS4) permit from the KDOW. KPDES discharge permits include wastewater treatment facilities that discharge directly to a stream, facilities discharging storm water, and some agricultural operations. The KPDES is not the only permitting program that may affect water quality or quantity within a watershed; other permitting examples include water withdrawal permits, permits to build structures within a floodplain, permits to construct an on-site sewage treatment disposal system (OSTDS), and permits to land apply waste from sewage treatment plants. However, within the framework of the TMDL process a KPDES-permitted source is defined as one regulated under the KPDES program.

A non KPDES-permitted source does not include surface or ground water dischargers regulated by the KPDES program but does include nonpoint sources of pollution. Nonpoint sources of pollution are caused by runoff from precipitation over and/or through the ground and are correlated to land use.

### **5.1 KPDES-Permitted Sources (assigned a WLA)**

Permitted sources include all sources regulated by the KPDES permitting program. In 401 KAR 10:001, KDOW adopted the definition of a point source per 33 U.S.C. 1362(14) as “any discernable, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, or concentrated animal feeding operation or vessel or other floating craft, from which pollutants are or may be discharged.” However, 401 KAR 10:001 exempts “agricultural storm water run-off or return flows from irrigated agriculture” from the definition of a point source. A Waste Load Allocation (WLA) is assigned to KPDES-permitted sources.

#### **5.1.1 Sanitary Wastewater Dischargers**

The KPDES program issues discharge permits to facilities that treat sanitary wastewater, among other types. These facilities can be large publicly owned treatment works (POTWs) that service thousands of households and businesses, small, privately operated package facilities that service one business or one residential development, or a home unit that services an individual residence.

KPDES-permitted sanitary wastewater discharges are located within the Beaver Creek watershed (Table 5.1. and Figure 5.1). There are certainly other KPDES-permitted facilities in the impaired watersheds; however, those identified in this report treat sanitary wastewater and contribute an E. coli (or fecal coliform) load to an impaired segment. Facilities in Table 5.1 receive WLAs. The location of sources by subwatershed are shown in Figures 5.2 through 5.7.



Table 5.1 KPDES-permitted Sources of E. coli (or Fecal Coliform) in Beaver Creek Watershed.  
AI # indicates Agency Interest number, an internal identification number.

KPDES #	Name	Type	AI #	Latitude	Longitude
KY0094510	CONSOL OF KY INC JONES FORK	BITUMINOUS COAL & LIG, SURFACE	2514	37.432222	-82.874722
KY0103136	MCDOWELL DOLLAR GENERAL STORE	DEPARTMENT STORE	1263	37.458333	-82.749166
KY0079430	ALLEN CENTRAL HIGH SCHOOL	SCHOOL	35254	37.518055	-82.808333
KY0077542	BEAVER CREEK ELEM SCHOOL	SCHOOL	33945	37.351111	-82.812222
KY0093017	JAMES A DUFF ELEM SCHOOL	SCHOOL	35258	37.508333	-82.815555
KY0087076	JONES FORK ELEM SCHOOL	SCHOOL	35359	37.417500	-82.879166
KY0079421	MCDOWELL ELEM SCHOOL	SCHOOL	35252	37.453888	-82.736111
KY0089435	OSBORNE ELEM SCHOOL	SCHOOL	35251	37.363611	-82.730277
KY0093912	SOUTH FLOYD HIGH SCHOOL	SCHOOL	35260	37.385298	-82.735564
KY0106755	MAY VALLEY ELEM SCHOOL	SCHOOL	82092	37.3569174	-82.778872
KY0083089	GOLDEN YEARS REST HOME	INTERMEDIATE CARE FACILITY	2517	37.463611	-82.833611
KYG400642	ALLEN RESIDENCE	DWELLING OTHER THAN APARTMENT	1133	37.552500	-82.784444
KYG401197	BARTLEY RESIDENCE	DWELLING OTHER THAN APARTMENT	4405	37.430555	-82.727777
KYG401936	BENTLEY RESIDENCE	DWELLING OTHER THAN APARTMENT	79842	37.577222	-82.725277
KYG400753	BINGHAM RESIDENCE	DWELLING OTHER THAN APARTMENT	1237	37.387777	-82.706388
KYG400479	BLACKBURN RESIDENCE	DWELLING OTHER THAN APARTMENT	1143	37.485277	-82.740555
KYG401692	BLANKENSHIP RESIDENCE	DWELLING OTHER THAN APARTMENT	50021	37.419444	-82.688888
KYG400787	CARRAWAY RESIDENCE	DWELLING OTHER THAN APARTMENT	1158	37.576388	-82.776388
KYG400692	CASE RESIDENCE	DWELLING OTHER THAN APARTMENT	1161	37.505833	-82.711944
KYG400678	CASTLE RESIDENCE	DWELLING OTHER THAN APARTMENT	1162	37.518611	-82.721666
KYG401113	CASTLE RESIDENCE	DWELLING OTHER THAN APARTMENT	4350	37.497222	-82.851666
KYG401580	CAUDILL RESIDENCE	DWELLING OTHER THAN APARTMENT	44695	37.332777	-82.716388

KPDES #	Name	Type	AI #	Latitude	Longitude
KYG401603	CHILDERS RESIDENCE	DWELLING OTHER THAN APARTMENT	46147	37.411666	-82.851111
KYG401646	COCHRAN RESIDENCE	DWELLING OTHER THAN APARTMENT	48897	37.375833	-82.733611
KYG400854	COLLINS RESIDENCE	DWELLING OTHER THAN APARTMENT	1168	37.452222	-82.778611
KYG401516	COLLINS RESIDENCE	DWELLING OTHER THAN APARTMENT	1168	37.452500	-82.778333
KYG401821	COMBS RESIDENCE	DWELLING OTHER THAN APARTMENT	74243	37.457222	-82.737500
KYG400790	COOK RESIDENCE	DWELLING OTHER THAN APARTMENT	1173	37.377777	-82.688611
KYG402025	COOK RESIDENCE	DWELLING OTHER THAN APARTMENT	84292	37.526666	-82.775277
KYG401143	COOLEY RESIDENCE	DWELLING OTHER THAN APARTMENT	4331	37.576111	-82.730555
KYG401125	CRUM RESIDENCE	DWELLING OTHER THAN APARTMENT	4336	37.441111	-82.794722
KYG400659	CURRENT RESIDENCE	DWELLING OTHER THAN APARTMENT	4250	37.535833	-82.748611
KYG400520	DEROSSETT RESIDENCE	DWELLING OTHER THAN APARTMENT	1180	37.577777	-82.784722
KYG401582	DINGUS RESIDENCE	DWELLING OTHER THAN APARTMENT	45073	37.563055	-82.738611
KYG400614	DYE RESIDENCE	DWELLING OTHER THAN APARTMENT	1182	37.445277	-82.724722
KYG401140	DYE RESIDENCE	DWELLING OTHER THAN APARTMENT	4333	37.401388	-82.740000
KYG401352	EVERIDGE RESIDENCE	DWELLING OTHER THAN APARTMENT	15807	37.532222	-82.829444
KYG401121	FRASURE RESIDENCE	DWELLING OTHER THAN APARTMENT	4344	37.527777	-82.790000
KYG401587	GEARHEART RESIDENCE	DWELLING OTHER THAN APARTMENT	45396	37.471944	-82.763888
KYG400590	GOBLE RESIDENCE	DWELLING OTHER THAN APARTMENT	1196	37.531944	-82.870000
KYG400603	GREEN RESIDENCE	DWELLING OTHER THAN APARTMENT	1199	37.495277	-82.855555
KYG400969	HALL RESIDENCE	DWELLING OTHER THAN APARTMENT	1202	37.451388	-82.700277
KYG401475	HALL RESIDENCE	DWELLING OTHER THAN APARTMENT	74185	37.483333	-82.898333
KYG401590	HALL RESIDENCE	DWELLING OTHER THAN APARTMENT	45070	37.436111	-82.758888
KYG401931	HARVEL RESIDENCE	DWELLING OTHER THAN APARTMENT	79525	37.453888	-82.695833
KYG400567	HICKS RESIDENCE	DWELLING OTHER THAN APARTMENT	1218	37.455000	-82.773611

KPDES #	Name	Type	AI #	Latitude	Longitude
KYG400730	HOOVER RESIDENCE	DWELLING OTHER THAN APARTMENT	1222	37.533333	-82.867777
KYG402002	HOPKINS RESIDENCE	DWELLING OTHER THAN APARTMENT	82471	37.472500	-82.761388
KYG401040	HOWELL RESIDENCE	DWELLING OTHER THAN APARTMENT	4356	37.451944	-82.695000
KYG400806	JACOBS RESIDENCE	DWELLING OTHER THAN APARTMENT	1232	37.582222	-82.793333
KYG401133	JONES RESIDENCE	DWELLING OTHER THAN APARTMENT	4349	37.353611	-82.735555
KYG401699	JUSTICE RESIDENCE	DWELLING OTHER THAN APARTMENT	50138	37.608333	-82.736111
KYG401529	KEATHLEY RESIDENCE	DWELLING OTHER THAN APARTMENT	35892	37.590555	-82.723888
KYG400915	KESTER RESIDENCE	DWELLING OTHER THAN APARTMENT	1243	37.454444	-82.814166
KYG401730	KIDD RESIDENCE	DWELLING OTHER THAN APARTMENT	50950	37.494722	-82.880000
KYG401638	LAFERTY RESIDENCE	DWELLING OTHER THAN APARTMENT	47022	37.558333	-82.758888
KYG400593	LAWSON RESIDENCE	DWELLING OTHER THAN APARTMENT	1248	37.549444	-82.720000
KYG401271	LAWSON RESIDENCE	DWELLING OTHER THAN APARTMENT	15635	37.453055	-82.746944
KYG401851	LITTLE RESIDENCE	DWELLING OTHER THAN APARTMENT	75141	37.533611	-82.752777
KYG402117	LITTLE RESIDENCE	DWELLING OTHER THAN APARTMENT	103052	37.453333	-82.732777
KYG401654	YORK RESIDENCE	DWELLING OTHER THAN APARTMENT	49354	37.419389	-82.727417
KYG401970	MARTIN RESIDENCE	DWELLING OTHER THAN APARTMENT	81193	37.450277	-82.723611
KYG401073	MAY RESIDENCE	DWELLING OTHER THAN APARTMENT	4327	37.531666	-82.799166
KYG400612	MCKINNEY RESIDENCE	DWELLING OTHER THAN APARTMENT	1265	37.569166	-82.748611
KYG401541	MCKINNEY RESIDENCE	DWELLING OTHER THAN APARTMENT	36057	37.600833	-82.724166
KYG400970	MEADE RESIDENCE	DWELLING OTHER THAN APARTMENT	1266	37.372777	-82.675555
KYG401764	MCKINNEY RESIDENCE	DWELLING OTHER THAN APARTMENT	53921	37.571194	-82.732083
KYG400478	MITCHELL RESIDENCE	DWELLING OTHER THAN APARTMENT	1269	37.448611	-82.703055
KYG400666	MITCHELL RESIDENCE	DWELLING OTHER THAN APARTMENT	1270	37.527222	-82.828055
KYG401533	MOORE RESIDENCE	DWELLING OTHER THAN APARTMENT	35887	37.430000	-82.710555

KPDES #	Name	Type	AI #	Latitude	Longitude
KYG401442	MULLINS II RESIDENCE	DWELLING OTHER THAN APARTMENT	74062	37.392500	-82.739444
KYG400714	MULLINS RESIDENCE	DWELLING OTHER THAN APARTMENT	1274	37.427777	-82.743888
KYG400975	MULLINS RESIDENCE	DWELLING OTHER THAN APARTMENT	1276	37.491666	-82.785277
KYG401809	NEWMAN RESIDENCE	DWELLING OTHER THAN APARTMENT	71436	37.446944	-82.706111
KYG401772	ISON RESIDENCE	DWELLING OTHER THAN APARTMENT	54879	37.547778	-82.762500
KYG400836	PERKINS RESIDENCE	DWELLING OTHER THAN APARTMENT	1293	37.425555	-82.810000
KYG401548	PRATER RESIDENCE	DWELLING OTHER THAN APARTMENT	43224	37.517222	-82.847777
KYG401126	ROSE RESIDENCE	DWELLING OTHER THAN APARTMENT	4342	37.561944	-82.724166
KYG400339	ROWE RESIDENCE	DWELLING OTHER THAN APARTMENT	1304	37.566666	-82.732500
KYG402063	PRATER RESIDENCE	DWELLING OTHER THAN APARTMENT	97291	37.527494	-82.842581
KYG401981	SCARBERRY RESIDENCE	DWELLING OTHER THAN APARTMENT	81570	37.563611	-82.801944
KYG401721	SCOTT RESIDENCE	DWELLING OTHER THAN APARTMENT	50627	37.497777	-82.782777
KYG400844	SHEPHERD RESIDENCE	DWELLING OTHER THAN APARTMENT	1314	37.509166	-82.875555
KYG401218	SHEPPARD RESIDENCE	DWELLING OTHER THAN APARTMENT	12253	37.526944	-82.828055
KYG400677	SHREWBERRY RESIDENCE	DWELLING OTHER THAN APARTMENT	1315	37.504444	-82.716111
KYG400601	STUMBO RESIDENCE	DWELLING OTHER THAN APARTMENT	1327	37.449444	-82.714444
KYG401409	STUMBO RESIDENCE	DWELLING OTHER THAN APARTMENT	74025	37.438333	-82.756666
KYG400936	STURGILL RESIDENCE	DWELLING OTHER THAN APARTMENT	1328	37.560277	-82.726666
KYG401142	TACKETT RESIDENCE	DWELLING OTHER THAN APARTMENT	4332	37.475277	-82.755277
KYG401470	TACKETT RESIDENCE	DWELLING OTHER THAN APARTMENT	74181	37.319444	-82.698333
KYG400778	TURNER RESIDENCE	DWELLING OTHER THAN APARTMENT	1343	37.548611	-82.763333
KYG401540	WALLACE RESIDENCE	DWELLING OTHER THAN APARTMENT	43120	37.492500	-82.836944
KYG401296	WEBB RESIDENCE	DWELLING OTHER THAN APARTMENT	15655	37.474444	-82.845000
KYG401353	WILLIAMSON RESIDENCE	DWELLING OTHER THAN APARTMENT	33378	37.540277	-82.816388

KPDES #	Name	Type	AI #	Latitude	Longitude
KYG401406	WILLIAMSON RESIDENCE	DWELLING OTHER THAN APARTMENT	74022	37.476111	-82.744444
KYG401601	WILLIAMSON RESIDENCE	DWELLING OTHER THAN APARTMENT	46144	37.502777	-82.724166
KYG400579	WRIGHT RESIDENCE	DWELLING OTHER THAN APARTMENT	1367	37.543888	-82.751944
KYG401645	DUFF RESIDENCE	DWELLING OTHER THAN APARTMENT	48864	37.456222	-82.750000
KYG400724	YOUNG RESIDENCE	DWELLING OTHER THAN APARTMENT	1369	37.469444	-82.763888
KYG401868	ROWE RESIDENCE	DWELLING OTHER THAN APARTMENT	75746	37.582494	-82.792359
KYG401883	ALLEN RESIDENCE	DWELLING OTHER THAN APARTMENT	76185	37.562778	-82.732476
KYG401857	HOWARD RESIDENCE	DWELLING OTHER THAN APARTMENT	75556	37.537221	-82.849438
KYG401876	BILITER RESIDENCE	DWELLING OTHER THAN APARTMENT	76078	37.543383	-82.864965
KY0103233	S & V MHP	MOBILE HOME SITES	1305	37.473055	-82.752777
KY0096342	LEFT BEAVER CREEK TOWNHOUSES	APARTMENT BUILDINGS	1255	37.466944	-82.755277
KY0072974	WARCO HOUSING PROJECT	APARTMENT BUILDINGS	1352	37.550277	-82.773888
KY0042854	KNOTT CO WATER & SEWER DIST	SEWERAGE SYSTEMS	2527	37.351388	-82.859166
KY0026921	MARTIN STP	SEWERAGE SYSTEMS	1262	37.580555	-82.751944
KY0105228	WAYLAND STP	SEWERAGE SYSTEMS	35761	37.448055	-82.816111
KY0028789	WHEELWRIGHT STP	SEWERAGE SYSTEMS	40534	37.348888	-82.717500
KY0107051	EASTERN STP	SEWERAGE SYSTEMS	35260	37.517819	-82.809619
KY0085791	MCDOWELL APPALACHIAN REG HOSP	HOSPITAL	1134	37.458055	-82.748888



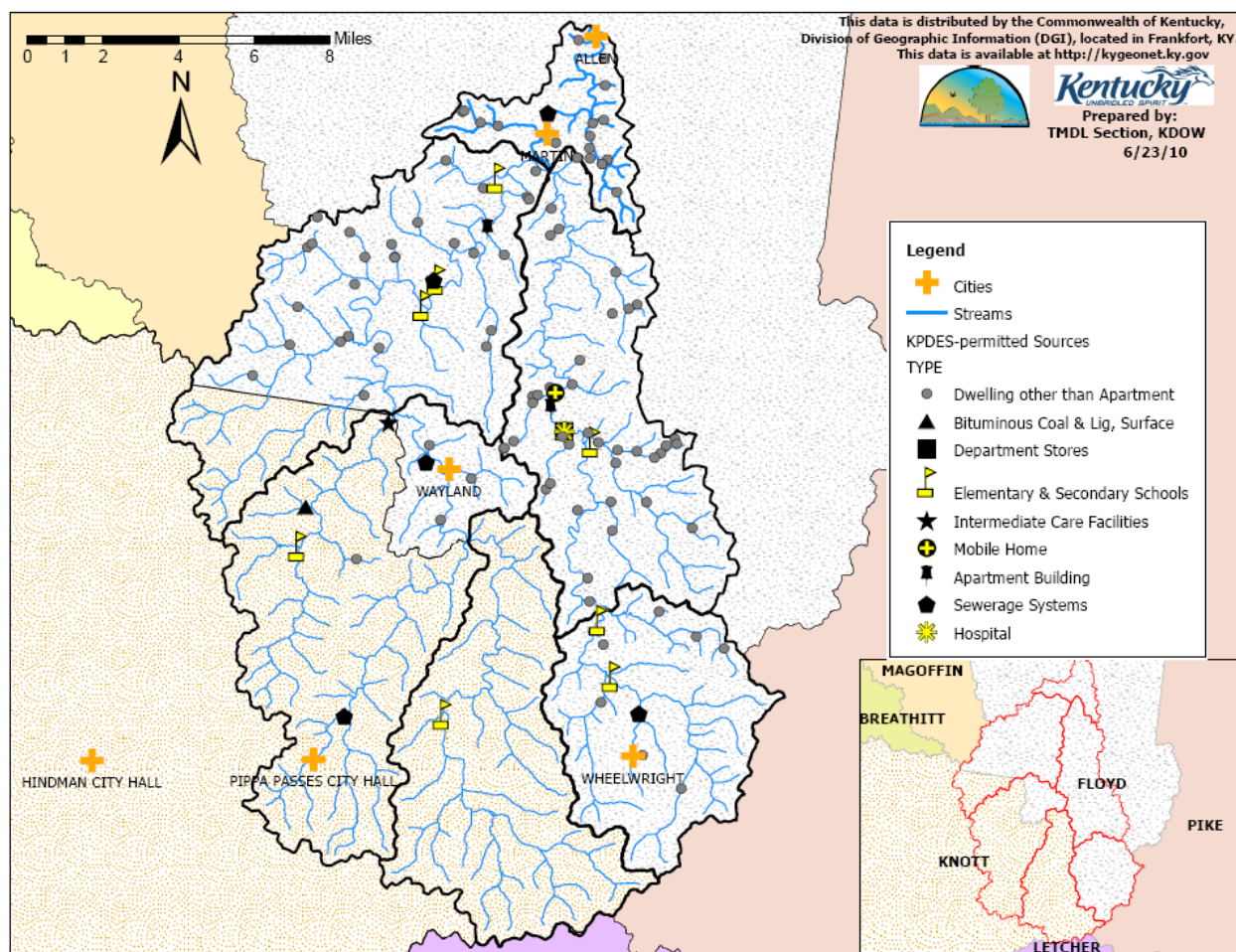


Figure 5.1 KPDES-permitted Sources of *E. coli* (or Fecal Coliform) in the Beaver Creek Watershed

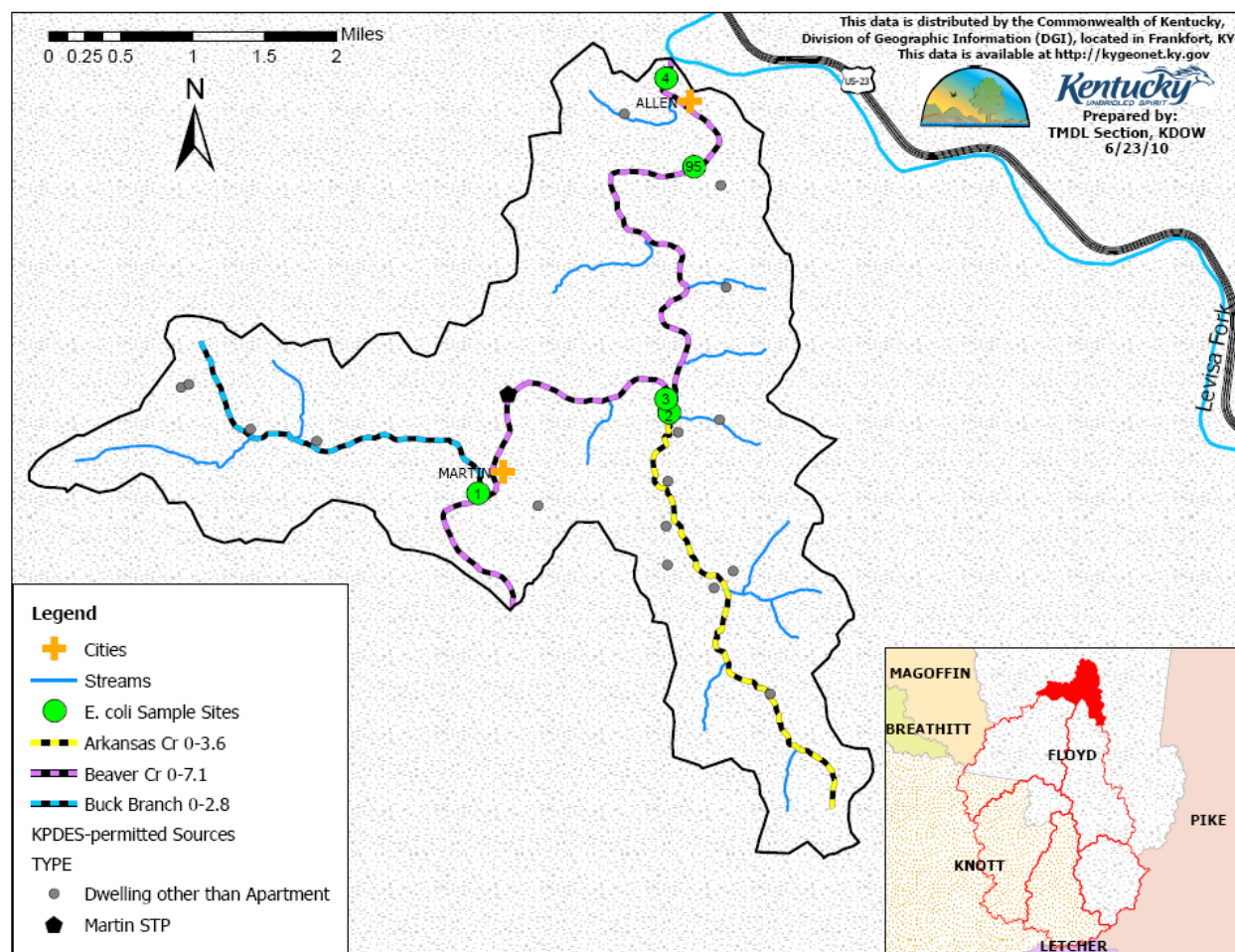


Figure 5.2 KPDES-permitted Sources of E. coli (or Fecal Coliform) in the Mainstem Beaver Creek Subwatershed

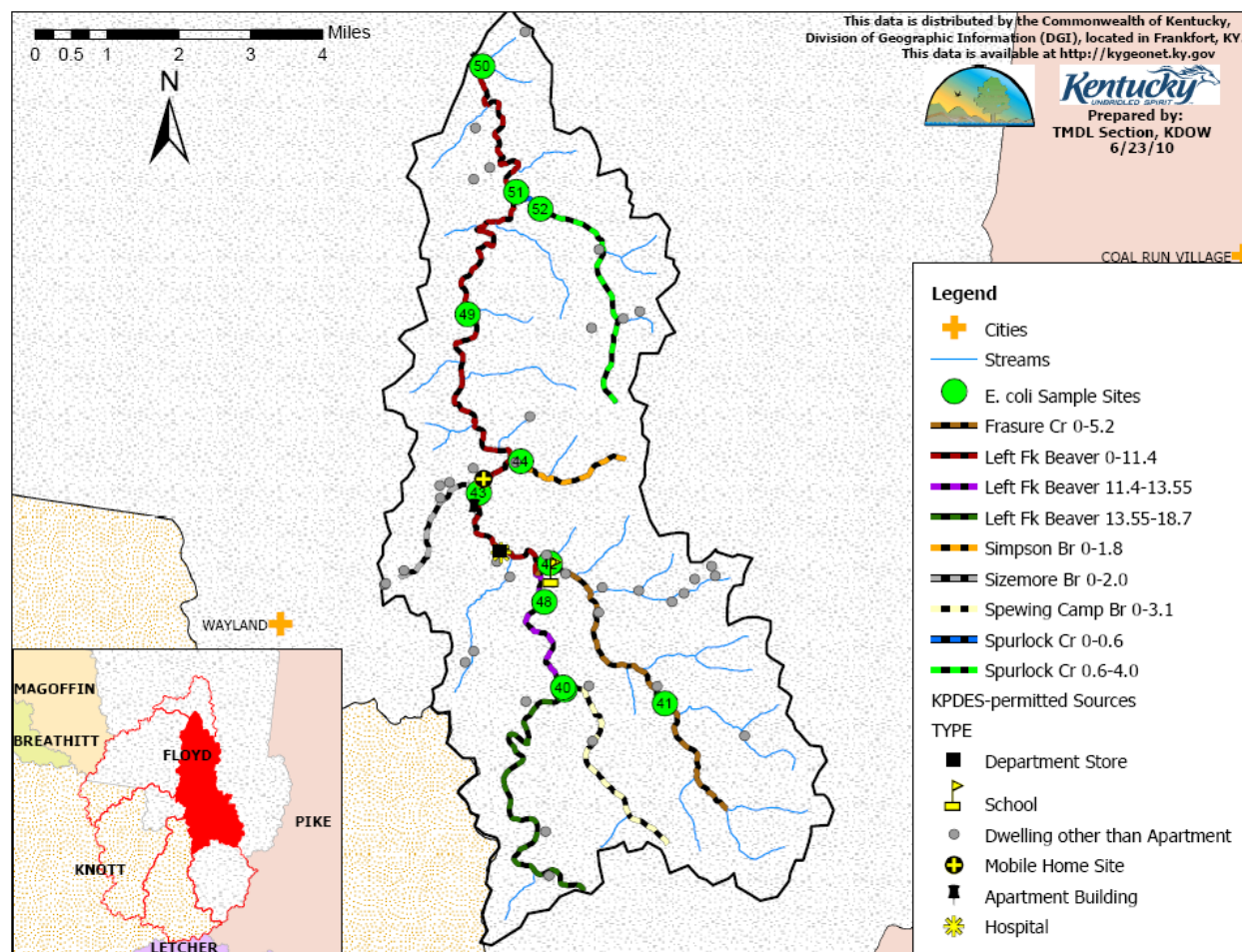


Figure 5.3 KPDES-permitted Sources of E. coli (or Fecal Coliform) in the Lower Left Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.



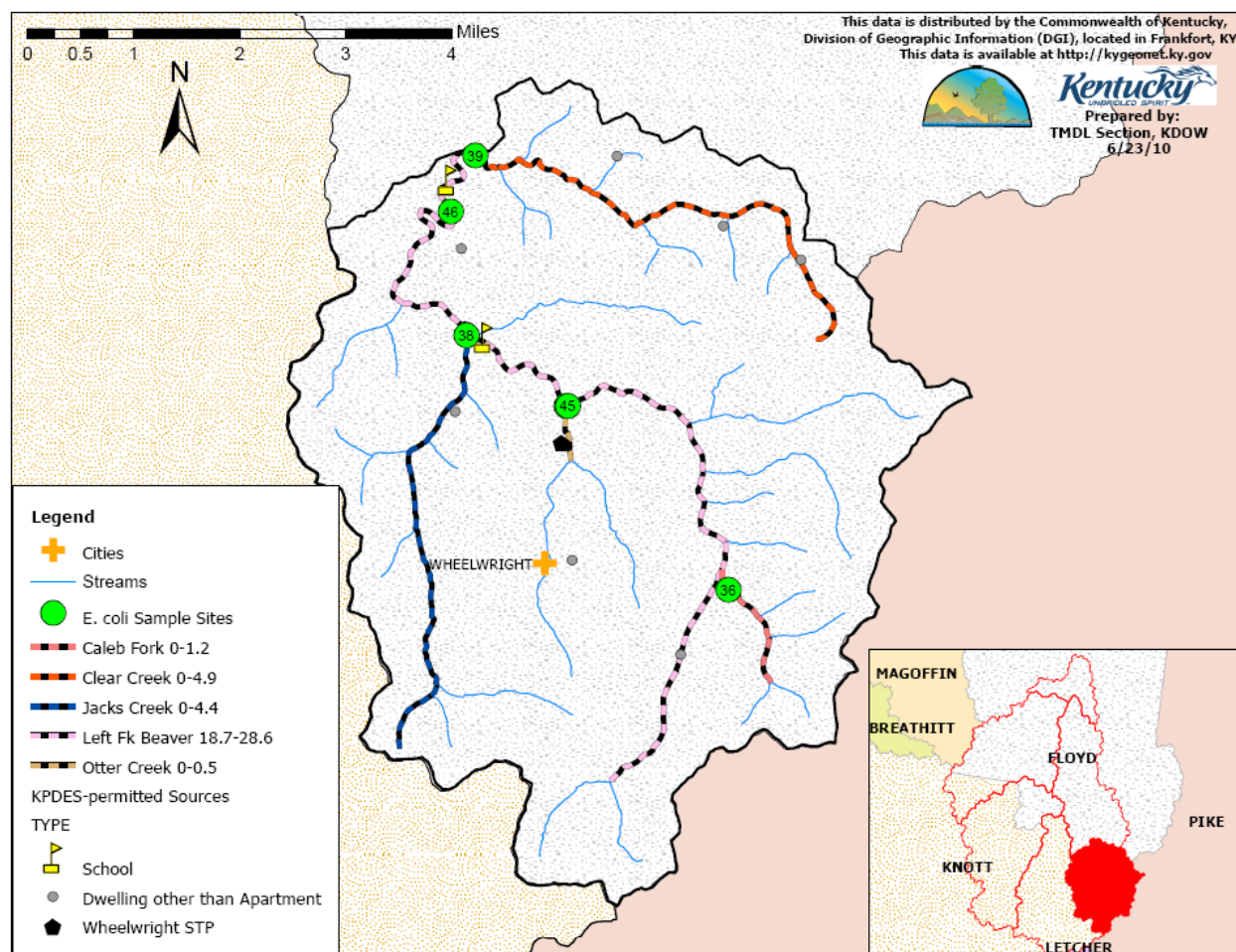


Figure 5.4 KPDES-permitted Sources of E. coli (or Fecal Coliform) in the Upper Left Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

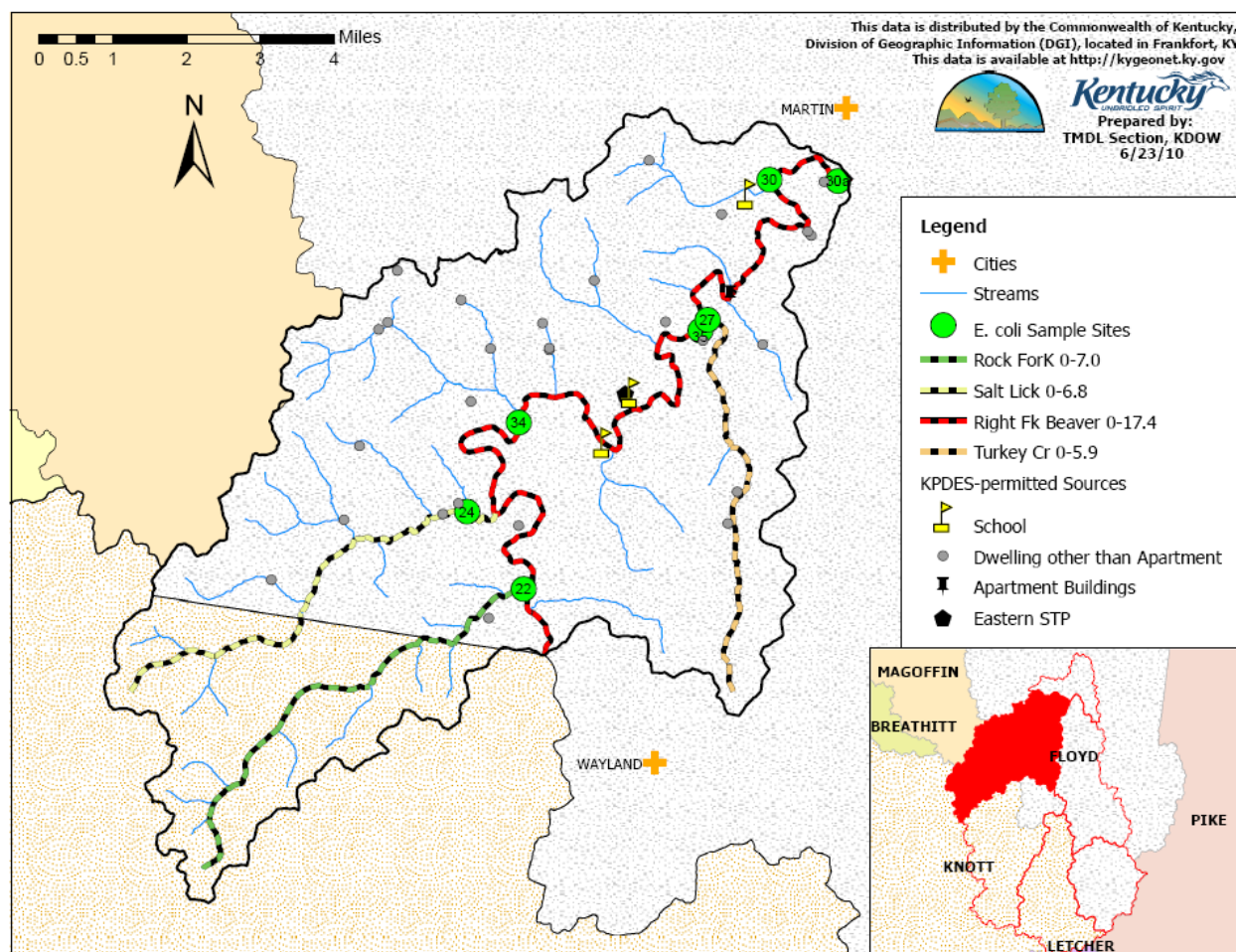


Figure 5.5 KPDES-permitted Sources of E. coli (or Fecal Coliform) in the Lower Right Fork Beaver Creek Subwatershed



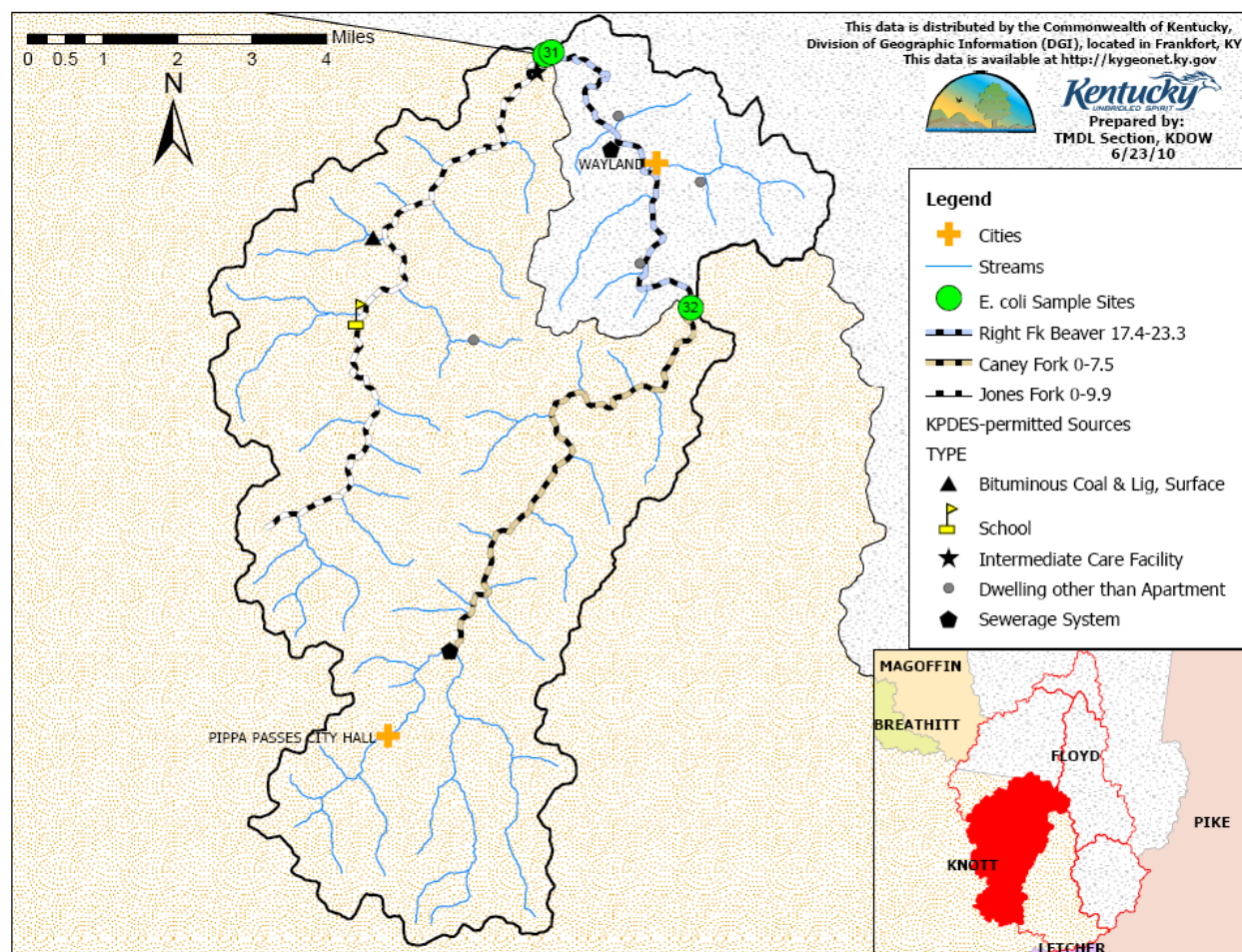


Figure 5.6 KPDES-permitted Sources of *E. coli* (or Fecal Coliform) in the Middle Right Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 20 is under site 31.



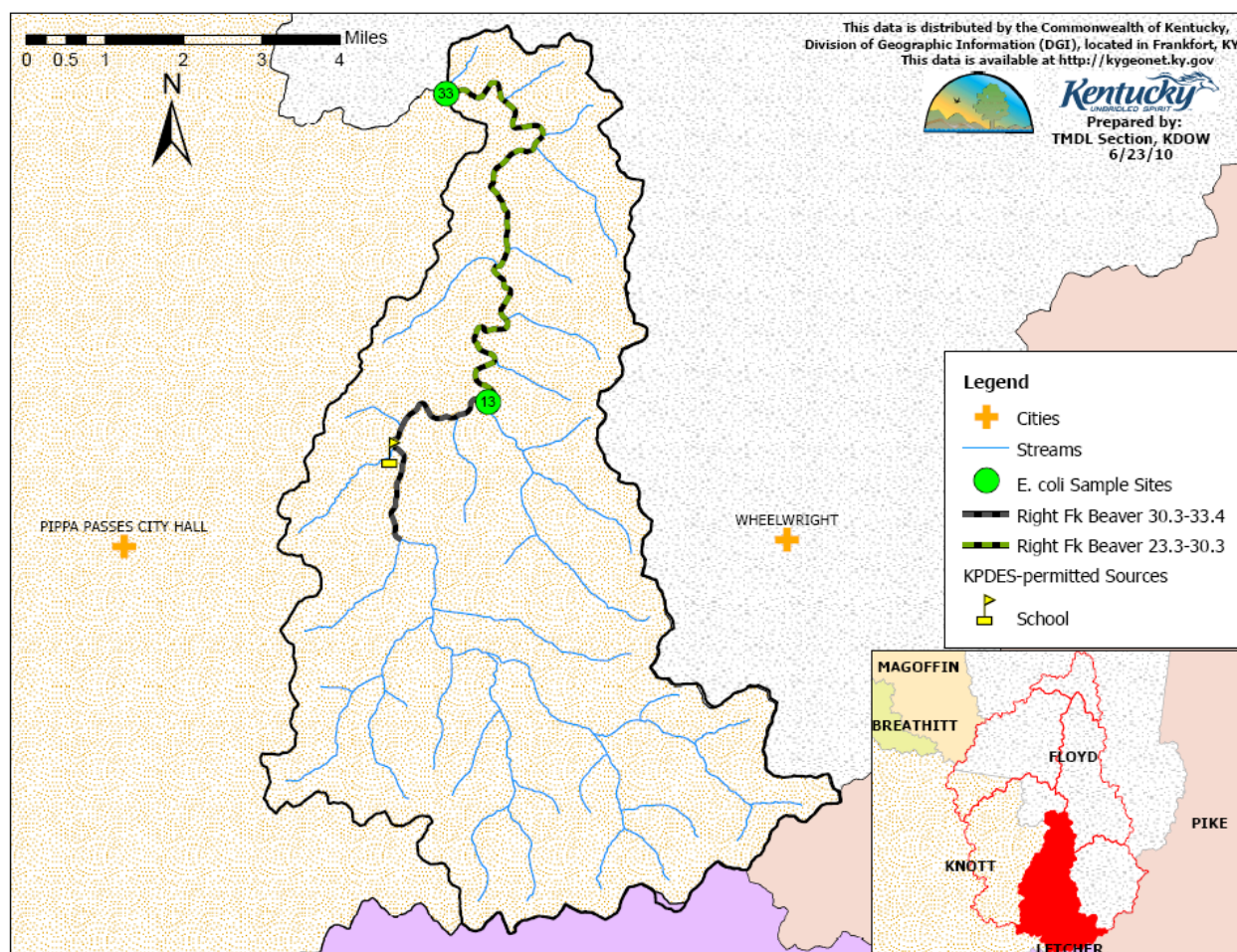


Figure 5.7 KPDES-permitted Sources of *E. coli* (or Fecal Coliform) in the Upper Right Fork Beaver Creek Subwatershed

#### 5.1.1.1 Sewerage Systems in Beaver Creek

Kentucky regulation 401 KAR 5:006 specifies wastewater-planning requirements for regional areas. Municipal wastewater treatment facilities are required to prepare 20-year regional planning documents under certain conditions as described in regulation. Section 2 of this regulation specifies that:

*“(1) No new regional facility shall be constructed, no average daily design capacity of an existing regional facility shall be expanded by more than thirty (30) percent, or no existing regional sewage collection system shall expand its equivalent population served by more than thirty (30) percent of the existing population, without the regional planning agency submitting a regional facility plan and the cabinet approving the plan. All regional facility plans shall be prepared by a registered professional engineer.”*

And that:

- “(2) A regional planning agency shall submit a regional facility plan or regional facility plan update when the following occurs:*
- (a) A new regional facility is proposed to be constructed within the planning area;*
  - (b) The average daily design capacity of an existing regional facility is proposed to be expanded by more than thirty (30) percent;*
  - (c) The equivalent population served by an existing regional sewage collection system is proposed to be expanded by more than thirty (30) percent of the existing population served;*
  - (d) A regional facility or other governmental agency applies for a grant from the U.S. EPA or applies for a loan from the federally assisted wastewater revolving fund pursuant to the requirements of 40 CFR Part 35 and 200 KAR Chapter 17. A plan of study shall be submitted to the cabinet for the project to be eligible to be placed on the project priority list and receive priority points;*
  - (e) A regional planning agency considers the submission of the plan to be in the best interest of the public and the environment; or*
  - (f) It has been twenty (20) years since the regional planning agency or its successor has submitted a regional facility plan.”*

Additionally, Section 4 of 401 KAR 5:005 requires that construction permits only be issued for wastewater treatment and conveyance facilities if the construction is compatible with the facilities plan.

*“Section 4. Application; Preliminary Considerations. (1) A permit shall not be granted to a facility that is not compatible with a regional facility plan or with a water quality management plan approved by the cabinet or the U.S. EPA.”*

There are three wastewater-planning areas in the Beaver Creek watershed, South Floyd, Prestonsburg, and the Knott County Water & Sewer District (of which the Caney Creek Water District is in Beaver Creek watershed) as shown in Figure 5.8. The South Floyd Planning Area covers almost the entire Beaver Creek watershed that is in Floyd County. The Prestonsburg Planning Area covers a small fraction of Beaver Creek around the city of Allen as shown in Figure 5.9. The Caney Creek Water District serves a small area in the headwaters of Caney Creek as shown in Figure 5.10.

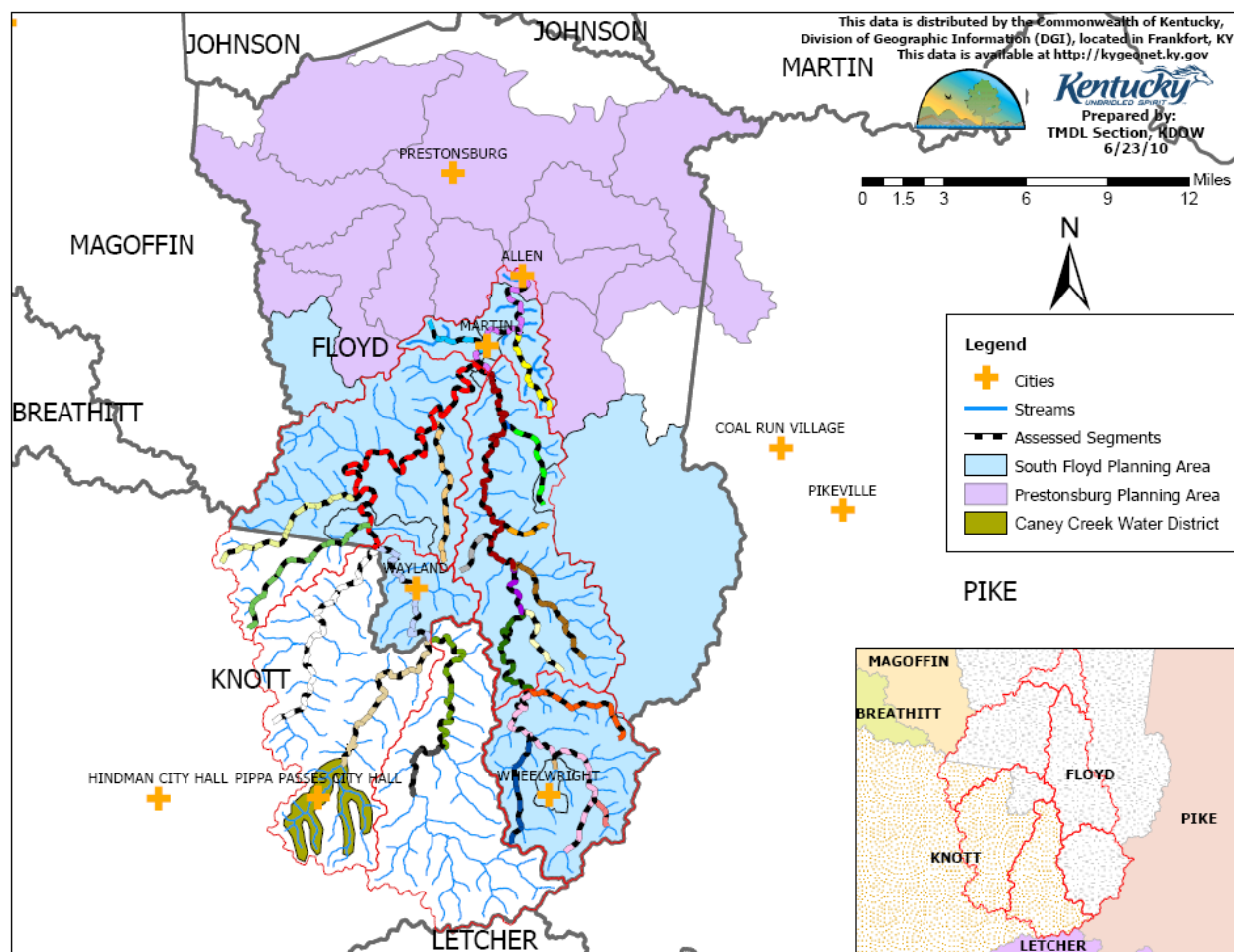


Figure 5.8 Wastewater Planning Areas in the Beaver Creek Watershed

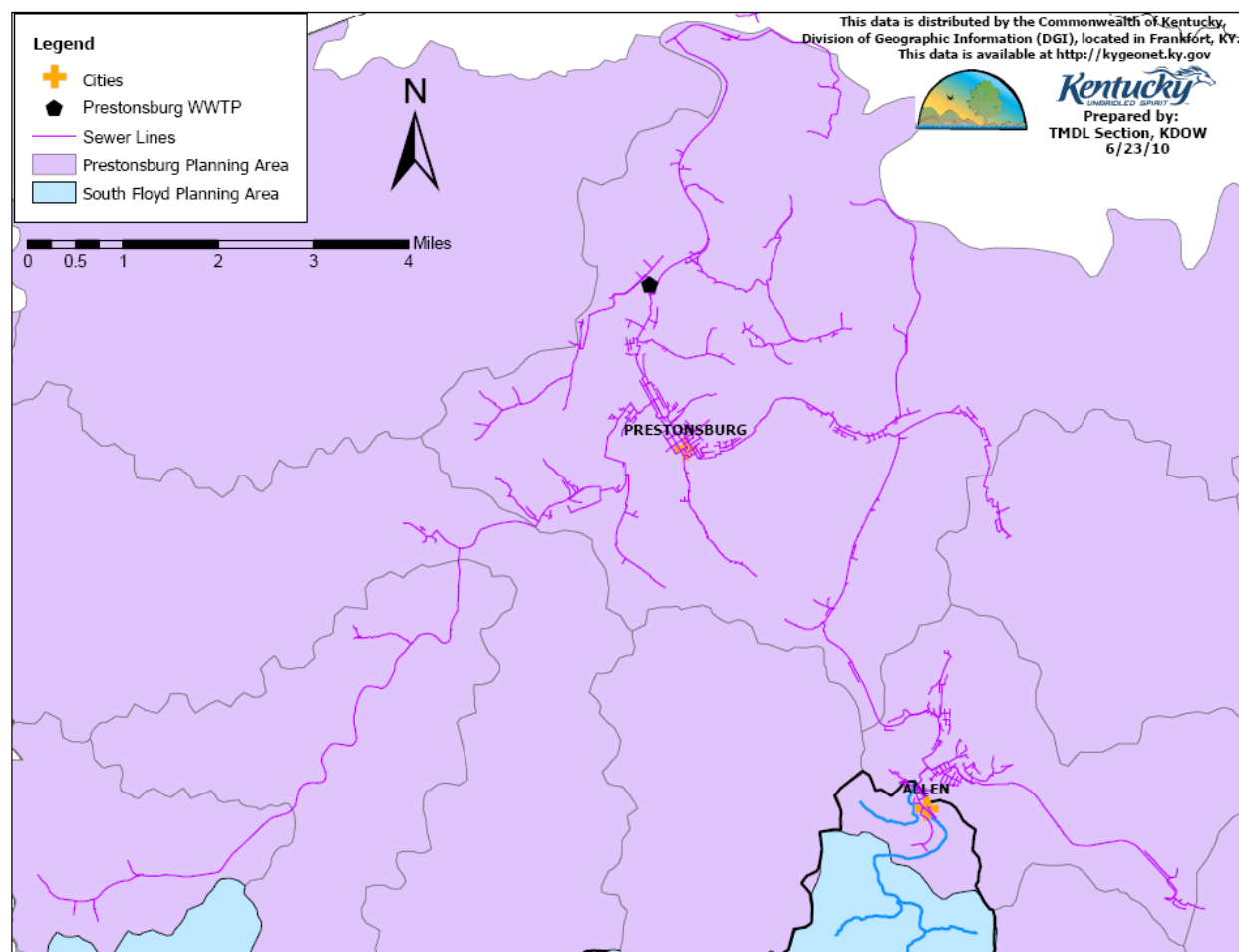


Figure 5.9 Detail of the Prestonsburg Planning Area and Sewer Lines

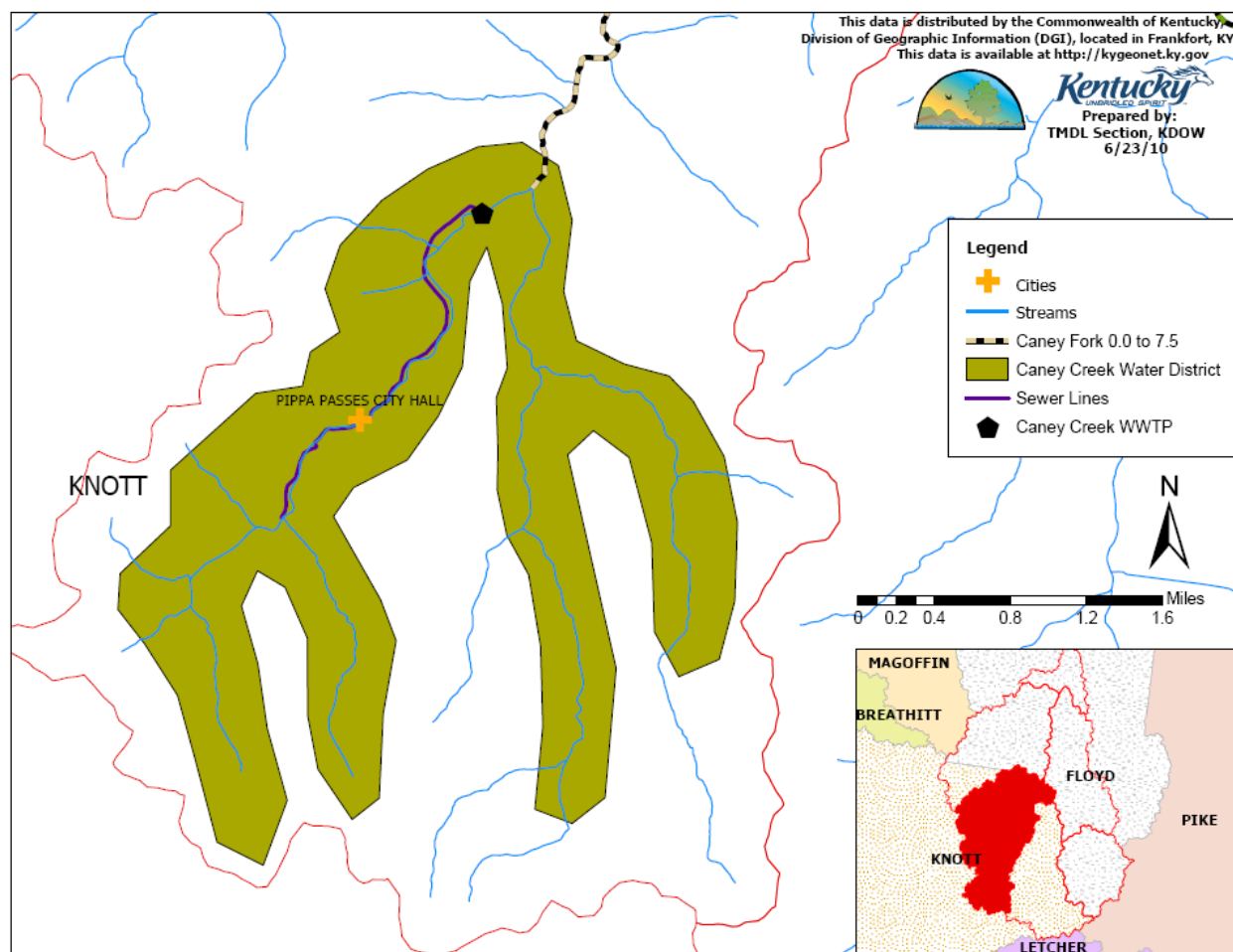


Figure 5.10 Detail of the Caney Creek Water District and Sewer Lines

Information about permitted sources was obtained from the application for permit submitted by the permitted entity and from the KPDES-permit. DMR information was obtained from The EPA Permit Compliance System database (US EPA, 2010) and the TEMPO database maintained by the Department for Environmental Protection.

Eastern Waste Water Treatment Plant (WWTP) KPDES permit # KY0107051 (effective 6/1/08-5/31/13)

The Eastern treatment plant is a 0.025 million gallons per day (MGD) plant owned and operated by the Southern Water and Sewer District. It is located in the Lower Right Fork Beaver Creek subwatershed and the effluent is discharged at river mile (RM) 8.4 of Right Fork Beaver Creek. It serves 42 residential units and came on-line during June 2008. The treatment process consists of influent screens, surge tanks for flow equalization, extended aeration, clarifiers, and chlorine disinfection. Waste sludge is placed in holding tanks and is disposed of by a sanitary service company at a publicly owned treatment works. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. A review of Discharge Monitoring Reports (DMRs, see Appendix C for DMR data from all major KPDES-permitted sources) from June 2008 through December 2009 indicate 5 months with exceedances of permit limits for E. coli.



Knott County Water and Sewer District Caney Creek WWTP KPDES permit # KY0042854 (effective 7/1/07-6/30/12)

The Knott County Caney Creek WWTP is a 0.10 MGD plant owned by the Knott County Water and Sewer District. It is located in the Middle Right Fork Beaver Creek subwatershed and the effluent is discharged at RM 7.8 of Caney Creek. It has about 130 sewer connections and serves about 612 people on Alice Lloyd College and about 390 residents in and around Pippa Passes. The treatment process consists of screening, grit removal, aeration, clarification, chlorine disinfection and dechlorination. Waste sludge is processed by drying beds and is disposed of in a landfill. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. A review of DMRs from August 2007 through November 2009 indicates 10 months with exceedances of permit limits for E. coli. Prior to August 07, this facility reported fecal coliform and one month exceeded permit limits from Jan 2007 through July 2007.

Martin Sewerage Treatment Plant KPDES permit # KY0026921 (effective 12/1/05-11/30/10)

The Martin Sewerage Treatment Plant (STP) is a 0.12 MGD plant owned by the city of Martin. It is located in the Mainstem Beaver Creek subwatershed and the effluent is discharged to RM 5.2 of Beaver Creek. It serves approximately 1,100 residents and is the regional facility for the area around Martin. The treatment process consists of a grinder and grit channel at the influent, an equalization basin with an oxidation ditch and clarifier combination with ultra-violet disinfection and post aeration. Sludge is pumped from a holding tank to drying beds. The dried sludge is composted or is hauled to a landfill. KPDES permit limits for this discharge are: Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average. A review of DMRs from August 2007 through November 2009 indicate 10 months with exceedances of permit limits for Fecal coliform; however, no exceedances have been reported since June 2008.

Wayland Sewerage Treatment Plant KPDES permit # KY0105228 (effective 12/1/2008-11/30/13)

The Wayland plant is a 0.1 MGD plant owned and operated by the Southern Water and Sewer District. It is located in the Middle Right Fork Beaver Creek subwatershed and the effluent is discharged at RM 19.8 of Right Fork Beaver Creek. It serves a population of 512 in and around Wayland. The wastewater treatment process for this facility consists of screening, extended aeration, activated sludge, settling, micro screening, chlorine disinfection and post aeration. Sludge is pumped from a holding tank to a belt filter press and is hauled to a landfill. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. A review of DMRs from December 2008 through July 2009 indicates 3 months with exceedances of permit limits for E. coli. Prior to December 2008, this facility reported fecal coliform and 2 months showed exceedances of permit limits from Jan 2007 through November 2008.



Wheelwright Sewerage Treatment Plant KPDES permit # KY0028789 (effective 7/1/07-6/30/12)

The Wheelwright plant is a 0.225 MGD plant owned and operated by Wheelwright Utilities. It is located in the Upper Left Fork Beaver Creek subwatershed and the effluent is discharged at RM 0.35 of Otter Creek. It serves a total population of 217 in and around Wheelwright (171 residents), Upper Burton (11 residents) and Lower Burton (35 residents). The wastewater treatment process for this facility consists of an extended aeration plant with chlorine disinfection and dechlorination. Sludge is processed by drying beds and is hauled to a landfill. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. A review of DMRs from July 2007 through December 2009 indicates 4 months with exceedances of permit limits for E. coli. Prior to July 2007, this facility reported fecal coliform and 1 month showed an exceedance of permit limits from Jan 2007 through June 2007.

Prestonsburg WWTP and Landfarm KPDES Permit # KY0027413 (effective 3/1/10-2/28/15)

The Prestonsburg plant is a 1 MGD facility owned and operated by the Prestonsburg City's Utilities Commission. It is located outside of the Beaver Creek Watershed and the effluent is discharged at RM 53.2 of Levisa Fork. It serves a population of 7,523 in the city of Prestonsburg and the surrounding area including the Allen area, which is within the Beaver Creek Mainstem subwatershed. Sewer lines extend from Allen to the Prestonsburg WWTP and the Prestonsburg City's Utilities Commission is responsible for these lines (See Section 5.1.1.2 Illegal WLA Sources, below). The wastewater treatment process consists of screening, grit removal, primary settling, conventional activated sludge, secondary settling, chlorine disinfection, and dechlorination. Sludge is processed by aerobic digestion, belt filter press, and drying beds, then is hauled to a landfill for disposal. The treated effluent is occasionally used for irrigation of a golf course and for wash-down water in the treatment plant. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is under a consent judgment to demonstrate efforts to control and eventually eliminate two combined sewer overflows (neither of which are in the Beaver Creek Watershed).

**5.1.1.2 Illegal WLA Sources**

Illegal WLA sources, by definition, are not allowed in the watershed, and receive an allocation of zero in the TMDL process. Illegal sources related to KPDES-permitted human waste disposal include leaking sewer lines and sanitary sewer overflows. Leaking sewer lines and sanitary sewer overflows are the responsibility of the permitted owner of the sewerage system, thus in addition to their outfall effluent, the sewerage systems noted above are responsible for discharges from sewer lines under their control. Although the Prestonsburg WWTP is not in the Beaver Creek Watershed, the sewer lines that extend to Allen are in the Beaver Creek Watershed and are permitted under the Prestonsburg permit. Leaking sewer lines and sanitary sewer overflows are illegal sources of E. coli (or fecal coliform) and thus a waste load of 0 colonies/day is assigned to these sources.

Note this Section of the TMDL is not intended to summarize the universe of potential illegal KPDES-permitted sources that may discharge pollutants into surface waters, nor does it attempt to summarize the universe of KPDES-permitted sources that may be operating illegally (e.g., outside of permit limits or conditions, etc.). Instead, it defines the illegal permitted sources that could be present in the watershed.

### **5.1.1.3 Package Treatment Plants in Beaver Creek Watershed**

#### Allen Central High School KPDES permit # KY0079430 (effective 3/1/07-2/28/12)

Allen Central High School has a 0.011 MGD package treatment plant, which is treated by extended aeration with disinfection. The treated effluent is discharged to RM 8.3 of Right Fork Beaver Creek. It is located next to the Eastern STP and is required to eliminate its discharge and connect to a comprehensive sewer system when it comes available and can adequately treat the wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from the quarters ending March 2007 through September 2009 indicate 5 quarters with exceedances of permit limits for E. coli.

#### Beaver Creek Elementary School KPDES permit # KY0077542 (effective 5/1/07-4/30/12)

Beaver Creek Elementary School has a 0.007 MGD package plant with its discharge treated by screening, primary settling, activated sludge, secondary settling, and chlorine disinfection followed by disinfection. Effluent is discharged at RM 0.05 of Hall Branch. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from the quarters ending June 2007 through December 2009 indicate no exceedances of permit limits for E. coli.

#### James A Duff Elementary School KPDES permit #KY0093017 (effective 3/1/07-2/28/12)

James A Duff Elementary School has 0.008 MGD package plant with its discharge treated by extended aeration with disinfection. The effluent is discharged at RM 9.3 of the Right Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending June 2007 through September 2009 indicate no exceedances of permit limits for E. coli.

#### Jones Fork Elementary School KPDES permit # KY0087076 (effective 5/1/07-4/30/12)

Jones Fork Elementary School has a 0.006 MGD package plant with its discharge treated by screening, grit removal, primary settling, activated sludge, secondary settling, and chlorine disinfection followed by dechlorination. Its effluent is discharged at RM 5.55 of Jones Fork.

KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending June 2007 through December 2009 indicate one quarter with an exceedance of permit limits for E. coli.

May Valley Elementary School KPDES permit # KY0106755 (effective 3/1/07-2/28/12)

May Valley Elementary School has a 0.006 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 0.3 of Stephens Branch. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending June 2007 through September 2009 indicate two quarters with an exceedance of permit limits for E. coli.

McDowell Elementary School KPDES #KY0079421 (effective 3/1/07-2/28/12)

McDowell Elementary School has a 0.015 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 0.4 of Frasure Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a monthly basis and a review of DMRs from March 2007 through September 2009 indicate one month with an exceedance of permit limits for E. coli.

Osborne Elementary School KPDES permit #KY0089435 (effective 3/1/07-2/28/12)

Osborne Elementary School has a 0.0068 MGD package plant with extended aeration and disinfection. Its effluent is discharged to RM 0.1 of Riley Branch. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending June 2007 through September 2009 indicate no exceedances of permit limits for E. coli.

South Floyd High School KPDES permit # KY0093912 (effective 3/1/07-2/28/12)

South Floyd High School has a 0.015 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 19.3 of Left Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a

maximum weekly average. This facility is required to submit DMRs on a monthly basis and a review of DMRs from March 2007 through September 2009 indicate eight months with exceedances of permit limits for E. coli.

S & V Mobile Home Park KPDES permit # KY0103233 (effective 4/1/07-6/30/12)

S & V Mobile Home Park has a 0.0099 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 9.1 of Left Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit DMRs on a quarterly basis and a review of DMRs from quarters ending September 2007 through December 2009 indicate two quarters with exceedances of permit limits for E. coli.

Left Fork Beaver Creek Townhouses KPDES permit # KY0096342 (effective 2/1/07-1/31/12)

Left Fork Beaver Creek Townhouses has a 0.018 MGD package plant with activated sludge, chlorine disinfection and dechlorination. Its effluent is discharged at RM 9.6 of Left Fork Beaver Creek. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs and a review of DMRs from February 2007 through September 2009 indicate ten months with exceedances of permit limits for E. coli.

Warco Housing Project KPDES permit # KY0072974 (effective 1/1/07-12/31/11)

Warco Housing Project has a 0.025 MGD package plant with extended aeration and disinfection. Its effluent is discharged to RM 4.15 of Right Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs and a review of DMRs from January 2007 through September 2009 indicate five months with exceedances of permit limits for E. coli.

McDowell Appalachian Regional Hospital KPDES permit # KY0085791 (effective 3/1/07-2/28/12)

McDowell Appalachian Regional Hospital has a 0.02 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 10.45 of the Left Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs and a review of DMRs from January 2007 through September 2009 indicate one month with an exceedance of permit limits for E. coli.

Consol of KY Inc-Jones Fork KPDES permit # KY0094510 (effective 5/1/06-11/30/06)

Consol of KY Inc-Jones Fork has a package treatment plant to treat bathhouse effluent with extended aeration. This treated effluent discharges to the coal preparation plant's static thickener and the underflow from this is discharged to a slurry impoundment permitted under KYG043632. The slurry impoundment discharges to RM 0.65 of Fourmile Branch. KPDES permit limits for this discharge are: Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs for fecal coliform and a review of DMRs from January 2007 through September 2009 indicate no exceedances of permit limits for fecal coliform.

McDowell General Store KPDES permit # KY0103136 (effective 12/1/07-11/30/12)

The McDowell General Store has a 0.0005 MGD package plant with aeration, sand filtration and chlorine treatment. Its effluent is discharged at RM 10.45 of Left Fork Beaver Creek. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit quarterly DMRs and a review of DMRs indicate that "no discharge" has been evident to collect samples.

Golden Years Rest Home KPDES permit # KY0083089 (effective 4/1/07-3/31/12)

Golden Years Rest Home has a 0.01 MGD package plant with extended aeration and disinfection. Its effluent is discharged at RM 0.3 of Jones Fork. This discharge is required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. KPDES permit limits for this discharge are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average. This facility is required to submit monthly DMRs and a review of DMRs from April 2007 through September 2009 indicate four months with exceedances of permit limits for E. coli.

**5.1.1.4 Home Units in Beaver Creek Watershed**

There are 92 known home units in the Beaver Creek Watershed, each with a permitted design capacity of 0.0005 MGD. Home units are indicated on maps and in tables as "dwelling other than apartment". Home units are wastewater treatment systems designed for an individual home. Although there are many options for a home unit, the minimum requirements are extended aeration, sand filtration, and disinfection. KPDES permit limits for these discharges are: E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average or Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average. These discharges are required to be eliminated by connection to a comprehensive sewer system when it becomes available and can adequately treat wastes. A spot check of DMRs for home units indicated that they frequently do not discharge (no flow box is checked on the DMRs). A spot check of inspection reports for this type of source indicated issues such as chlorination tablets not in contact with the sanitary wastewater. A compliance report run on home units across KY indicated only a 3 % compliance rate with permit requirements (personal

communication Larry Sowder, 2010). Due to issues with home units, KDOW currently requires that all other options be eliminated before approving any permits for new home units (KDOW, 2010c).

### 5.1.2 Future Growth WLA

The Future Growth WLA is a portion of the allowable load that is set aside for expansion of existing KPDES-permitted sources or new KPDES-permitted sources in the watershed. This could include new or expanded sewerage treatment plants, new package plants, or possibly new home units. This is not a required element in TMDLs, but is optional. Reserving a future growth WLA component in a TMDL allows growth to occur in the watershed without needing to re-open the TMDL to allocate waste loads to these new or expanded sources. Any new discharges of E. coli in the watershed must meet permit limits based on the Water Quality Standards in 401 KAR 10:031, and must not cause or contribute to an existing impairment.

Because of the sheer volume of permits for Home Units, it is possible that a permit has been missed; however this TMDL still applies to all sources of E. coli (or fecal coliform) regardless of whether or not they are indicated in the TMDL tables. Any KPDES-permitted source of sanitary wastewater not identified in this document will receive a TMDL load from the future growth WLA.

### 5.1.3 KPDES MS4 Storm Water

401 KAR 5:002(91) adopts the definition of Municipal Separate Storm Sewer Systems (MS4s) contained in 40 C.F.R. 122.26(b)(8) as:

*“a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains):*

- i. Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States;*
- ii. Designed or used for collecting or conveying storm water;*
- iii. Which is not a combined sewer; and*
- iv. Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2.”*

EPA has categorized MS4s into three categories: small, medium, and large. The medium and large categories are regulated under the Phase I Storm Water program. Large systems, such as the cities of Lexington and Louisville, have populations in excess of 250,000. Medium systems have populations in excess of 100,000 but less than 250,000. However, there are currently no medium-sized systems in Kentucky. Phase I systems have five-year permitting cycles and have



annual reporting requirements, including monitoring. The small MS4 category includes all MS4s not covered under Phase I. Since this category covers a large number of systems, only a select group are regulated under the Phase II rule, either being automatically included based on population (i.e., having a total population over 10,000 or a population per square mile in excess of 1000) or on a case-by-case basis due to the potential to cause adverse impact on surface water(s). Water quality monitoring is not a requirement of Phase II MS4s, unless the waterbody has an approved TMDL and the MS4 causes or contributes to the impairment for which the TMDL was written. There are no MS4 Communities in the Beaver Creek Watershed; therefore, a waste load allocation to a MS4 does not apply.

#### **5.1.4 KPDES-Permitted CSOs**

Combined Sewer Overflows (CSOs) are discharges from combined sewers, (i.e., sewers that carry both sanitary and storm water flow in the same pipe). In accordance with U.S. EPA's Combined Sewer Overflow Control Policy (1994), KDOW has signed Consent Decrees or Consent Judgments with all CSO communities in Kentucky. Within each Consent Decree, Judgment Communities are required to submit a Long Term Control Plan (LTCP) as the blueprint by which CSOs must be remediated (e.g., through separation of combined sewers, treatment of their discharge, and/or reduction in frequency, duration or volume, etc.) until they meet the WQS. KDOW then approves or disapproves the LTCP. Individual CSOs are given outfall numbers under the community's KPDES permit. There are no combined sewers in the Beaver Creek watershed; therefore, a waste load allocation to permitted CSOs does not apply.

#### **5.1.5 KPDES Animal Feeding Operations**

Animal feeding operations (AFOs) are defined by 401 KAR 5:002 Section 1(5) as:

*“a lot or facility, other than an aquatic animal production facility, that meets one (1) of the following descriptions:*

- (a) 1. "Large animal feeding operation" as defined in subsection (71) of this section; or*
- 2. "Medium animal feeding operation" as defined in subsection (83) of this section; and*

*(b) If:*

- 1.a. Animals other than aquatic animals, have been, are, or will be stabled or confined and fed or maintained for a total of forty-five (45) days or more in a twelve (12) month period; and*
- b. Crops, vegetation forage growth, or postharvest residues are not sustained in the normal growing season over any portion of the lot or facility.”*

Subsection 71 defines “large animal feeding operation” as:

*“an AFO that stables or confines as many as or more than the numbers of animals specified in any of the following categories:*

- (a) 700 mature dairy cows, whether milked or dry;*
- (b) 1,000 veal calves;*

- (c) 1,000 cattle other than mature dairy cows or veal calves. Cattle includes heifers, steers, bulls, or cow or calf pairs;
- (d) 2,500 swine each weighing fifty-five (55) pounds or more;
- (e) 10,000 swine each weighing less than fifty-five (55) pounds;
- (f) 500 horses;
- (g) 10,000 sheep or lambs;
- (h) 55,000 turkeys;
- (i) 30,000 laying hens or broilers, if the AFO uses a liquid manure handling system;
- (j) 125,000 chickens other than laying hens, if the AFO uses other than a liquid manure handling system;
- (k) 30,000 ducks, if the AFO uses other than a liquid manure handling system; or
- (l) 5,000 ducks, if the AFO uses a liquid manure handling system.”

Subsection 83 defines “medium animal feeding operation” as:

*“an AFO that stables or confines the type and number of animals within any of the following ranges:*

- (a) 200 to 699 mature dairy cows, whether milked or dry;
- (b) 300 to 999 veal calves;
- (c) 300 to 999 cattle other than mature dairy cows or veal calves. Cattle includes heifers, steers, bulls, or cow or calf pairs;
- (d) 750 to 2,499 swine each weighing fifty-five (55) pounds or more;
- (e) 3,000 to 9,999 swine each weighing less than fifty-five (55) pounds;
- (f) 150 to 499 horses;
- (g) 3,000 to 9,999 sheep or lambs;
- (h) 16,500 to 54,999 turkeys;
- (i) 9,000 to 29,999 laying hens or broilers, if the AFO uses a liquid manure handling system;
- (j) 37,500 to 124,999 chickens, other than laying hens, if the AFO uses other than a liquid manure handling system;
- (k) 25,000 to 81,999 laying hens, if the AFO uses other than a liquid manure handling system;
- (l) 10,000 to 29,999 ducks, if the AFO uses other than a liquid manure handling system; or
- (m) 1,500 to 4,999 ducks if the AFO uses a liquid manure handling system.”

401 KAR 5:002 further defines some AFOS as large, medium or small Confined Animal Feeding Operations (CAFOs) based upon definitions in 40 CFR 122.23:

*“An AFO is defined as a Large CAFO if it stables or confines as many as or more than the numbers of animals specified in any of the following categories:*

- (i) 700 mature dairy cows, whether milked or dry;
- (ii) 1,000 veal calves;
- (iii) 1,000 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs;
- (iv) 2,500 swine each weighing 55 pounds or more;

- (v) 10,000 swine each weighing less than 55 pounds;
- (vi) 500 horses;
- (vii) 10,000 sheep or lambs;
- (viii) 55,000 turkeys;
- (ix) 30,000 laying hens or broilers, if the AFO uses a liquid manure handling system;
- (x) 125,000 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system;
- (xi) 82,000 laying hens, if the AFO uses other than a liquid manure handling system;
- (xii) 30,000 ducks (if the AFO uses other than a liquid manure handling system); or
- (xiii) 5,000 ducks (if the AFO uses a liquid manure handling system)."

"An AFO is defined as a Medium CAFO if:

- (i) The type and number of animals that it stables or confines falls within any of the following ranges:
  - (A) 200 to 699 mature dairy cows, whether milked or dry;
  - (B) 300 to 999 veal calves;
  - (C) 300 to 999 cattle other than mature dairy cows or veal calves. Cattle includes but is not limited to heifers, steers, bulls and cow/calf pairs;
  - (D) 750 to 2,499 swine each weighing 55 pounds or more;
  - (E) 3,000 to 9,999 swine each weighing less than 55 pounds;
  - (F) 150 to 499 horses;
  - (G) 3,000 to 9,999 sheep or lambs;
  - (H) 16,500 to 54,999 turkeys;
  - (I) 9,000 to 29,999 laying hens or broilers, if the AFO uses a liquid manure handling system;
  - (J) 37,500 to 124,999 chickens (other than laying hens), if the AFO uses other than a liquid manure handling system;
  - (K) 25,000 to 81,999 laying hens, if the AFO uses other than a liquid manure handling system;
  - (L) 10,000 to 29,999 ducks (if the AFO uses other than a liquid manure handling system); or
  - (M) 1,500 to 4,999 ducks (if the AFO uses a liquid manure handling system); and
- (ii) Either one of the following conditions are met:
  - (A) Pollutants are discharged into waters of the United States through a man-made ditch, flushing system, or other similar man-made device; or
  - (B) Pollutants are discharged directly into waters of the United States which originate outside of and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation."

A small CAFO is defined as an "AFO that is designated as a CAFO and is not a Medium CAFO." A small CAFO may be designated if:

"it is a significant contributor of pollutants to waters of the United States" or "it has been determined that one or more pollutants in the AFO's discharge contributes to an impairment in a downstream or adjacent State or Indian country water that is impaired for that pollutant."

Additional requirements are that:

*“no AFO may be designated as a CAFO unless:*

- (i) Pollutants are discharged into waters of the United States through a manmade ditch, flushing system, or other similar manmade device; or*
- (ii) Pollutants are discharged directly into waters of the United States which originate outside of the facility and pass over, across, or through the facility or otherwise come into direct contact with the animals confined in the operation.*

401 KAR 5:060 allows an animal feeding operation to submit voluntary certification of no-discharge if there is no discharge from the AFO. AFOs that will or are anticipated to discharge to the waters of the Commonwealth are required to obtain a KPDES permit pursuant to 401 KAR 5:060, Section 10. “Discharge” means that *process wastewater* or water that comes into contact with the *production area* and discharges to the waters of the Commonwealth. *Process wastewater* means water directly or indirectly used in the operation of the AFO for any or all of the following: spillage or overflow from animal or poultry watering systems; washing, cleaning, or flushing pens, barns, manure pits, or other AFO facilities; direct contact swimming, washing, or spray cooling of animals; or dust control. Process wastewater also includes any water which comes into contact with any raw materials, products, or byproducts including manure, litter, feed, milk, eggs, or bedding. If the animal feeding operation is managing the waste generated at the facility as a liquid, a construction permit must be obtained pursuant to 401 KAR 5:005. Once defined as a CAFO, an operation must obtain either a KPDES General Permit or a KPDES Individual Permit depending upon the nature of the operation. Conditions of both types of permits include no discharge to surface waters. However, holders of a KPDES Individual Permit may discharge to surface waters during a 25-year (24-hour) or greater storm event. Currently, no AFOs or CAFOs have permits to discharge within the Beaver Creek watershed; therefore, a waste load allocation to AFOs or CAFOs does not apply.

## **5.2 Non-Permitted Sources (assigned a LA)**

Non-permitted sources include all sources not permitted by the KPDES permitting program, and are often referred to as nonpoint sources. According to 401 KAR 10:001, nonpoint means “any source of pollutants not defined as a point source.” While non-permitted sources are legal despite not having permits, their loads to surface water are still regulated by laws such as the Kentucky Agricultural Water Quality Act, federal Clean Water Act (i.e., the TMDL process) and 401 KAR 5:037 (Groundwater Protection Plans), among others. Non-permitted sources typically discharge pollutants to surface water in response to rain events. Rainfall data from the Price precipitation gage is shown in Figures 5.11 and 5.12 for the 2007 and 2008 PCR seasons, respectively (note: October 2008 data was not available at the time of writing of this document) (USGS, 2010). Red arrows indicate sampling dates for sites other than PRI095, which is displayed with the orange arrows. Of note is that samples collected during or following the June 27 and July 26, 2007 rain events tended to have much greater E. coli concentrations while samples collected on September 28, 2007, during a dry period, tended to have lower E. coli concentrations. These same trends were shown for samples collected during the July 31, 2008

rain event and during the August 22, 2008 extended dry period. These trends indicate that E. coli was being washed into the stream as the result of rainfall (see data in Appendix B).

Non-permitted sources for E. coli (and fecal coliform) exist in the watershed, and fall into various categories including agriculture, impacts directly attributable to humans, household pets and natural background such as from wildlife. All sources not regulated by the KPDES program will be allocated a pollutant load under the Load Allocation (LA) portion of the TMDL.

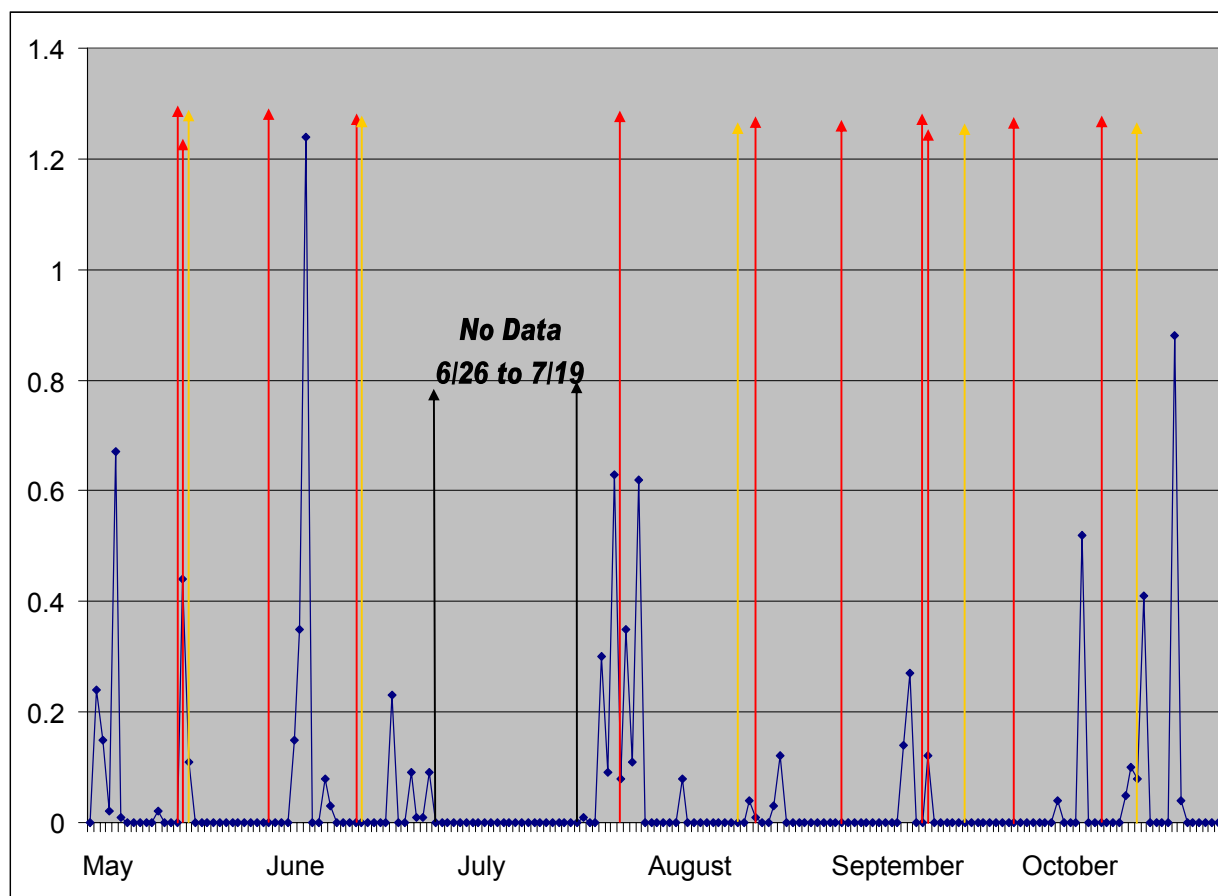


Figure 5.11 Daily Precipitation (inches) from Price Gage during the 2007 PCR Season

Note: No data indicates that the gage did not record information at that time. Red arrows indicate sampling dates for sites other than PRI095, which is displayed with the orange arrows.

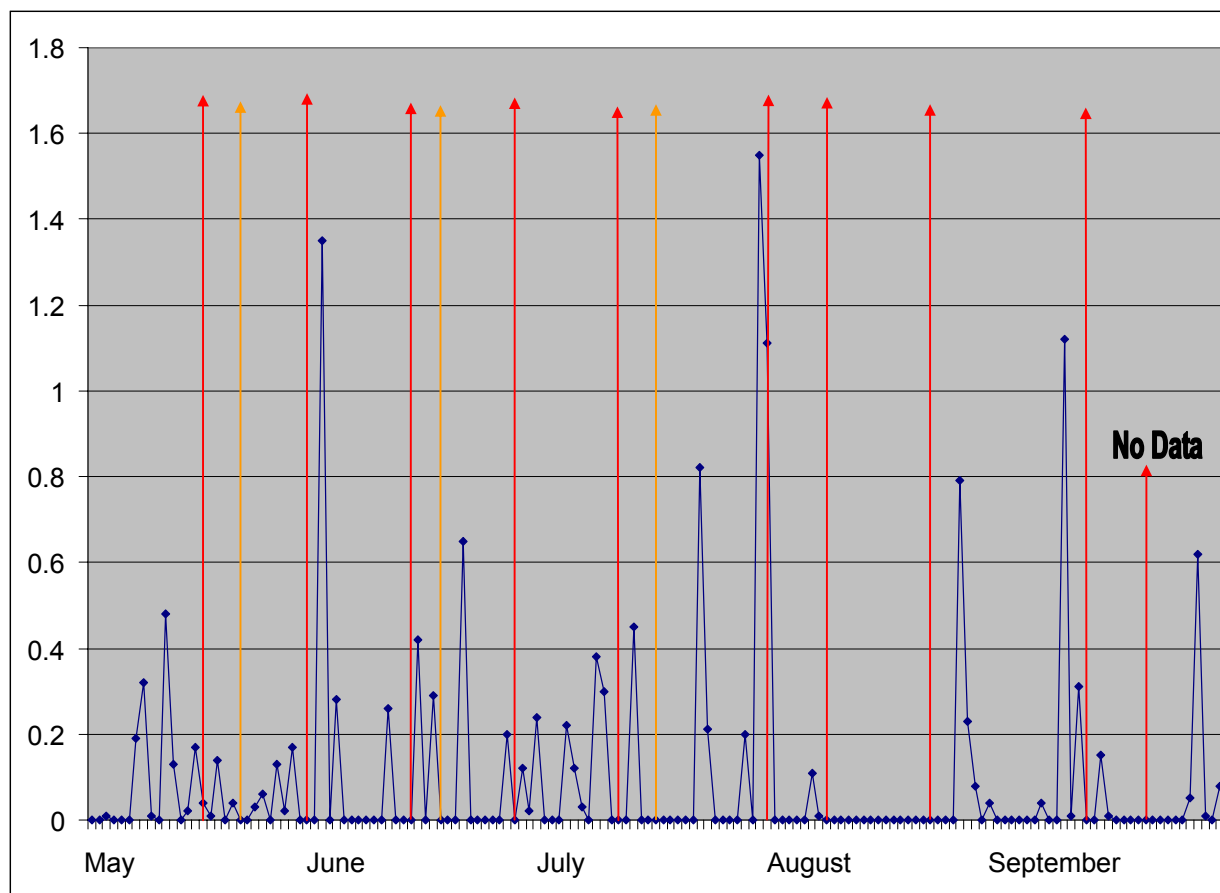


Figure 5.12 Daily Precipitation (inches) from Price Gage during the 2008 PCR Season

Note: No data indicates that the gage did not record information at that time. Red arrows indicate sampling dates for sites other than PRI095, which is displayed with the orange arrows.

### 5.2.1 Human Waste Disposal

Human waste disposal is of particular concern in rural areas. One way to determine locations of potential un-sewered residential areas is to examine the difference between the locations of drinking water lines and sewer lines. This is shown in Figures 5.13 through 5.19. Proposed water and sewer lines are also displayed. These figures demonstrate that the majority of the Beaver Creek Watershed is not serviced by a sewer system. Additionally, some subwatersheds have no existing and no proposed sewer lines. The un-sewered areas either have Onsite Sewage Treatment and Disposal Systems (OSTDS; either permitted [Home Units] or unpermitted [septic tanks or other system]) or sewage is discharged via straight pipes.

The Kentucky Infrastructure Authority (KIA) compiled a report titled “Water Resource Development: A Strategic Plan for Wastewater Treatment” (KIA 2000) with data from the Regional Area Development Districts (ADDs). This report indicates that the Beaver Creek watershed has known failing septic systems and concentrations of straight pipes. The percent of population serviced by sewers (as of 1999) was approximately 20% for Floyd County and only



about 10% for Knott County. Non-permitted OSTDS, including septic tanks, are commonly used in areas where providing a centralized sewage collection and treatment system is not cost-effective or practical. When properly sited, designed, constructed, maintained, and operated, septic systems are an effective means of disposing and treating domestic waste. The effluent from a well-functioning OSTDS is comparable to secondarily treated wastewater from a sewage treatment plant. When not functioning properly, they can be a source of *E. coli* (or fecal coliform) and other pollutants (e.g., nitrogen and phosphorus) to both groundwater and surface water. The soils information presented in Section 3.3 indicates that the soils in the Beaver Creek watershed are not ideal for installation of properly functioning septic systems.

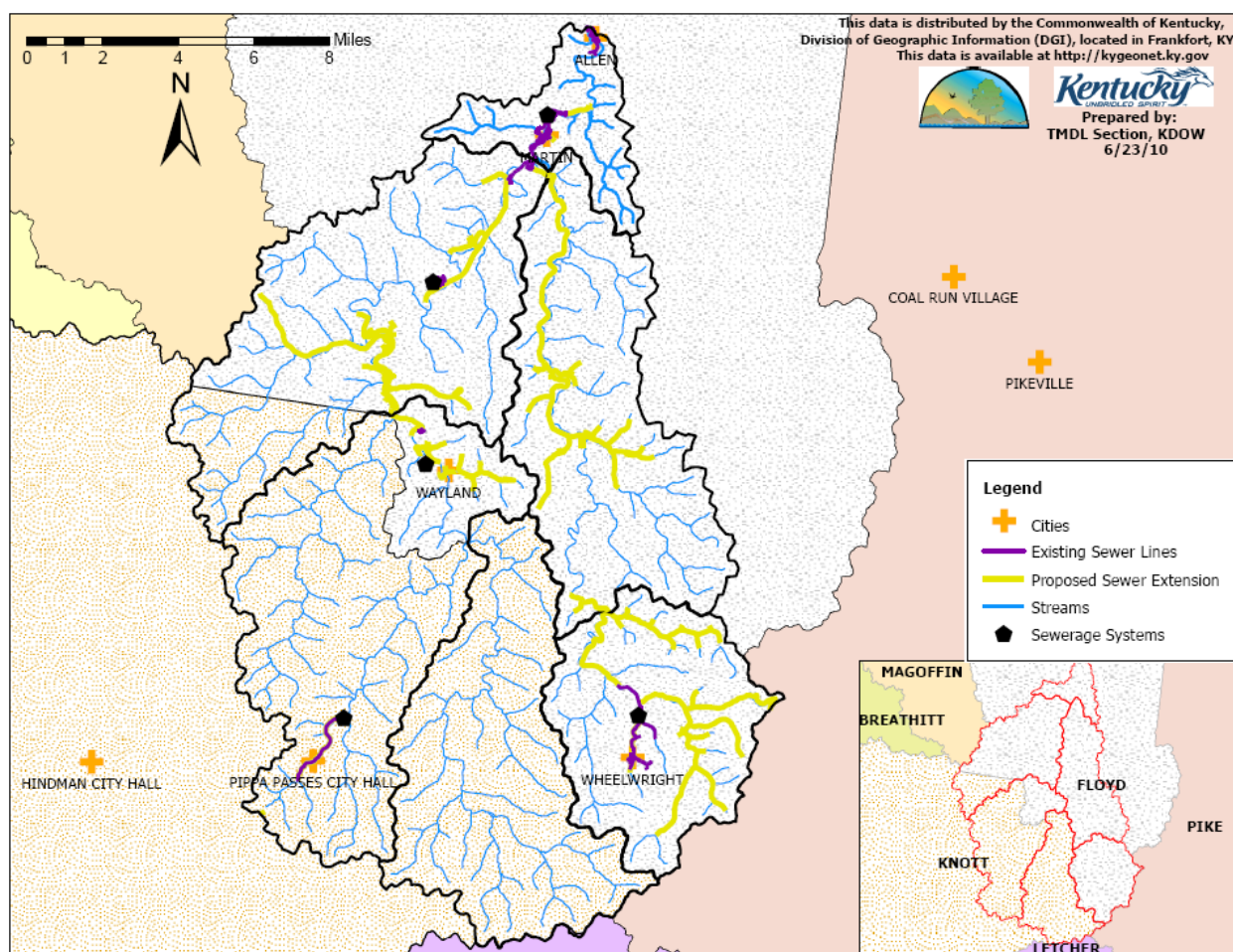


Figure 5.13 Existing and Proposed Sewer Lines in the Beaver Creek Watershed

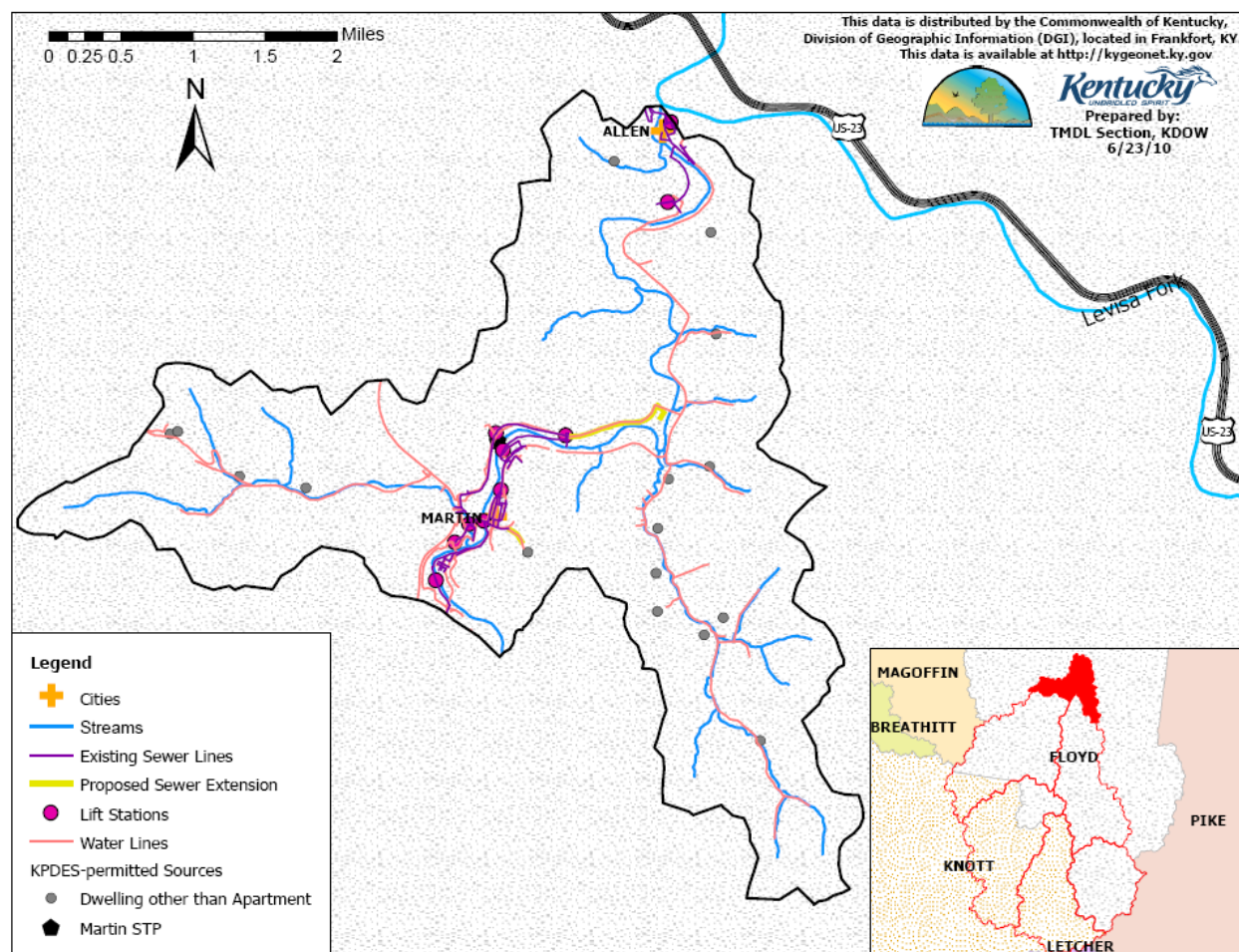


Figure 5.14 Existing and Proposed Water and Sewer Lines in the Mainstem Beaver Creek Subwatershed

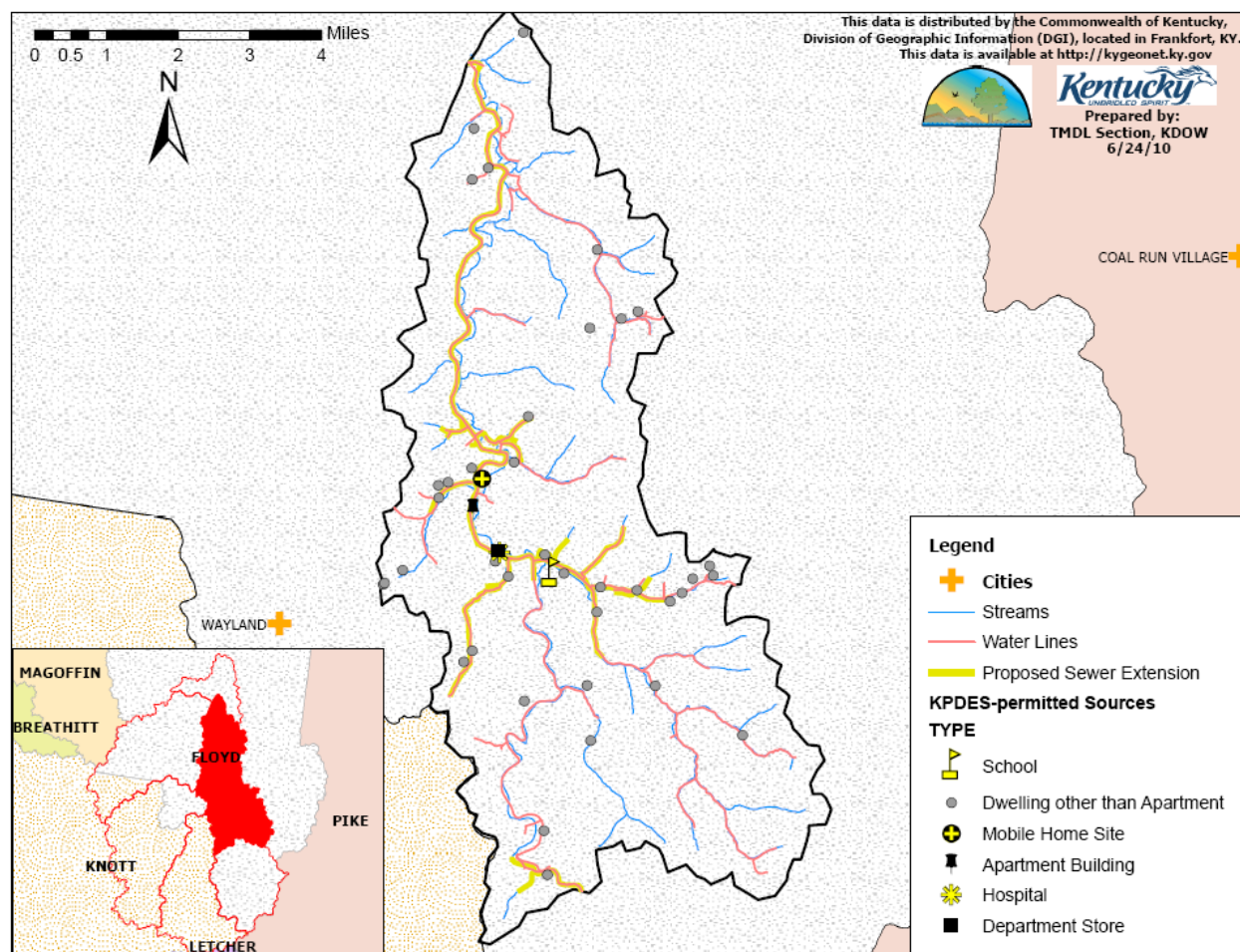


Figure 5.15 Existing and Proposed Water and Sewer Lines in the Lower Left Fork Beaver Creek Subwatershed

Note: No sewer lines are currently in this subwatershed.



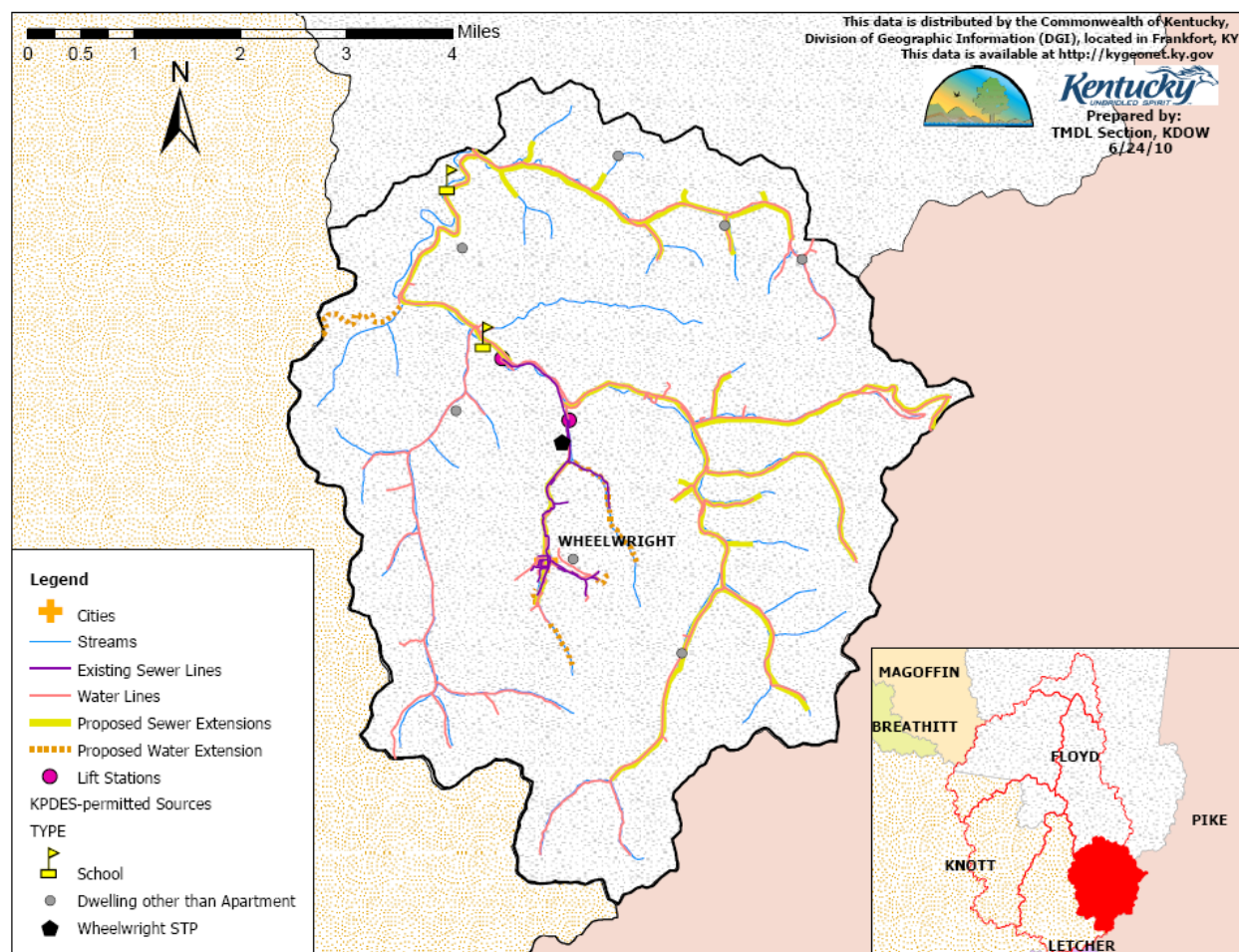


Figure 5.16 Existing and Proposed Water and Sewer Lines in the Upper Left Fork Beaver Creek Subwatershed

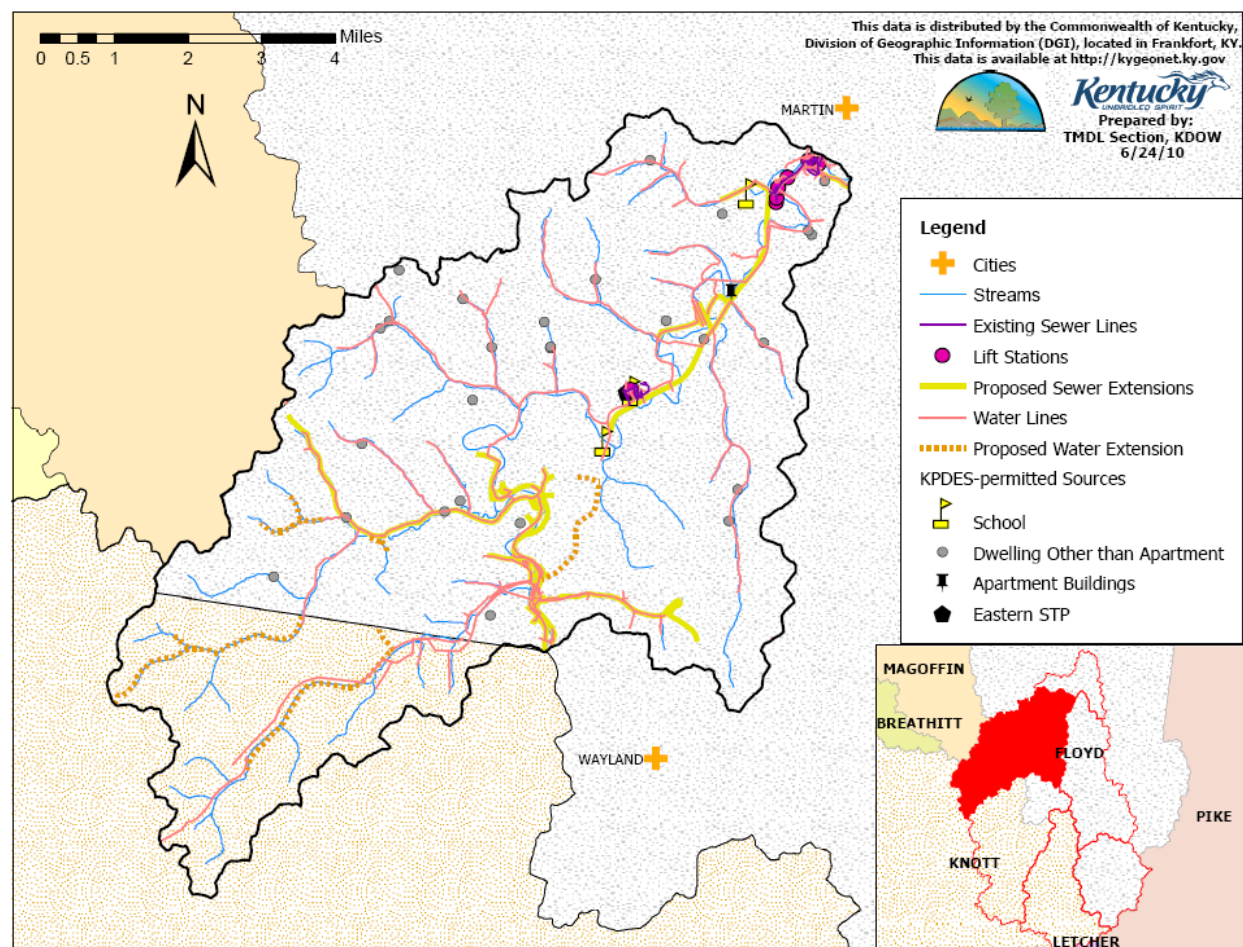


Figure 5.17 Existing and Proposed Water and Sewer Lines in the Lower Right Fork Beaver Creek Subwatershed



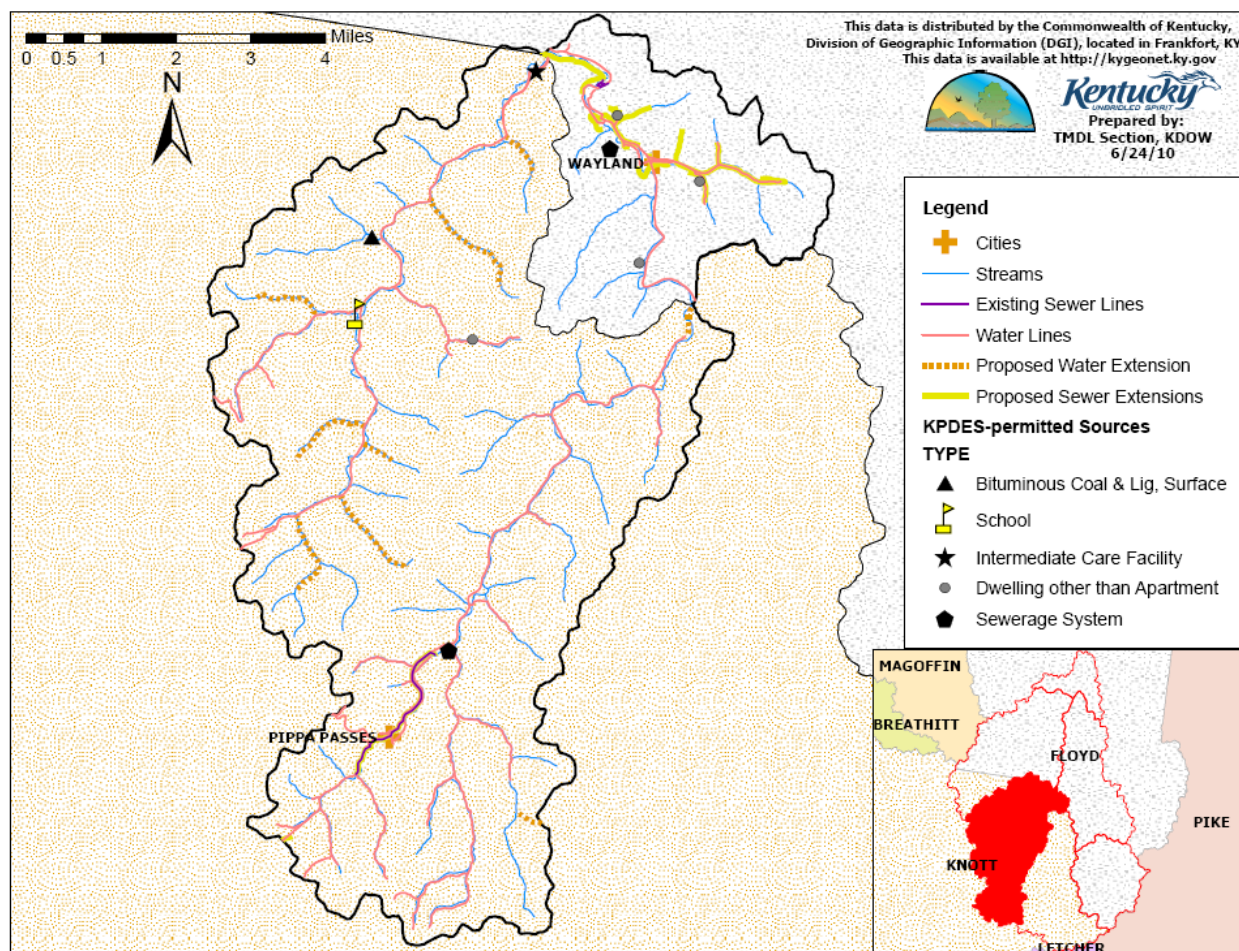


Figure 5.18 Existing and Proposed Water and Sewer Lines in the Middle Right Fork Beaver Creek Subwatershed



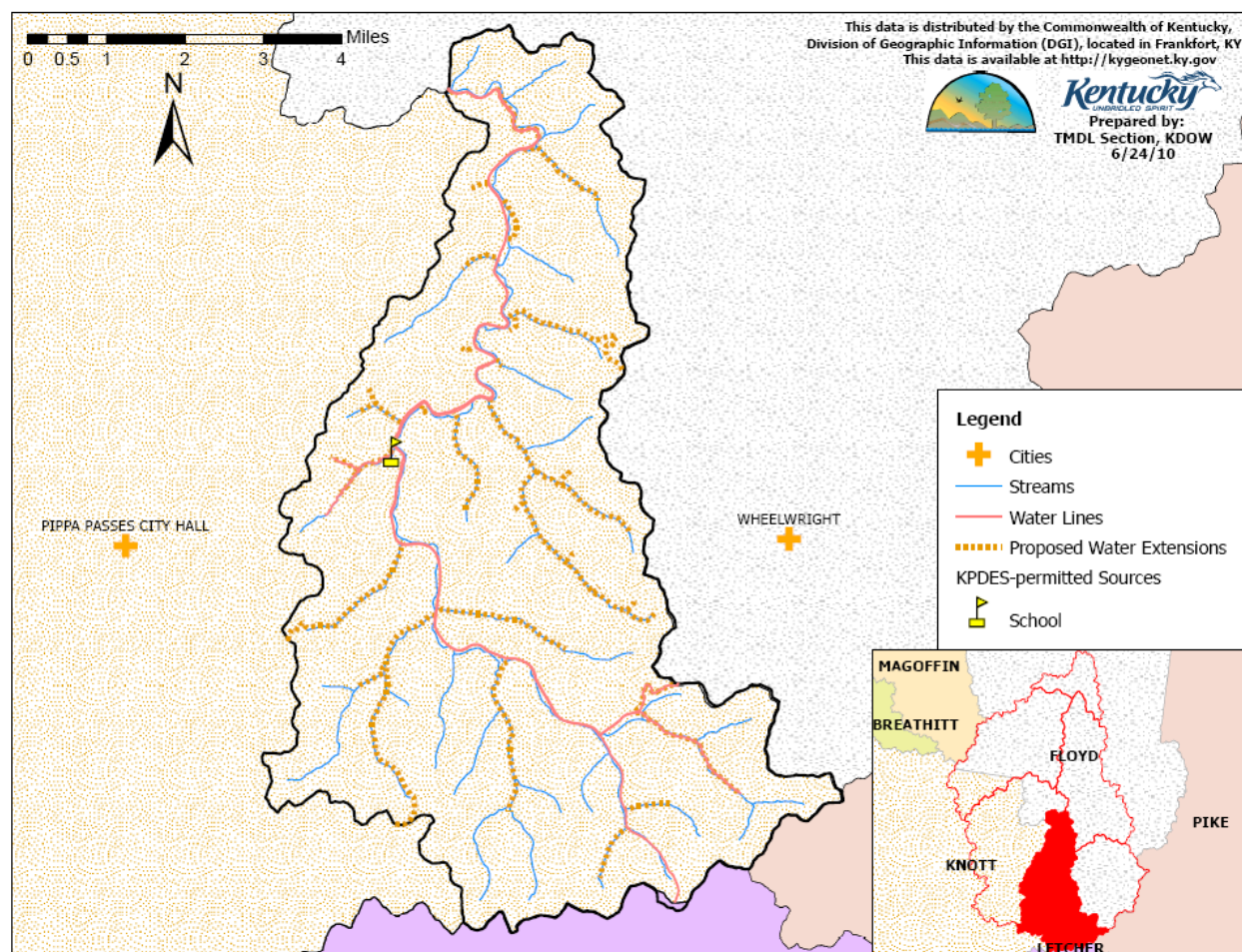


Figure 5.19 Proposed Water and Sewer Lines in the Upper Right Fork Beaver Creek Subwatershed

Note: No sewer lines are currently in this subwatershed and none are proposed.

### 5.2.2 Agriculture

The Kentucky Agriculture Water Quality Act (KRS 224.71-100 through 224.71-140) was passed by the 1994 General Assembly. The law focuses on the protection of surface water and groundwater resources from agricultural and silvicultural activities. The Act created the Kentucky Agriculture Water Quality Authority (KAWQA), a 15-member peer group made up of farmers and representatives from various agencies and organizations. The Act requires all farms greater than 10 acres in size to adhere to the Best Management Practices (BMPs) specified in the Kentucky Agriculture Water Quality Plan. Specific BMPs have been designated for all operations.

The U.S. Department of Agriculture (USDA) compiles agricultural statistics at the county level and reports results every five years in Agricultural Census reports. Select agricultural statistics reported in 2007 for the counties in the Beaver Creek Watershed are shown in Table 5.2 (USDA, 2007).

Table 5.2 Agricultural Statistics (2007)

Statistic	County	
	Floyd	Knott
Farms [# farms (acres)]	76 (7,785)	46 (6,937)
Cattle and Calves Inventory [#farms (total # animals)]	32 (431)	20 (695)
Beef [#farms (total # animals)]	27 (232)	19 /(D)
Milk Cows [#farms (total # animals)]	- (-)	1 (D)
Hogs and Pigs [#farms (total # animals)]	3 (15)	- (-)
Sheep and Lambs [#farms (total # animals)]	2 (D)	1 (D)
Layers 20 weeks old or older [#farms (total # animals)]	6 (86)	6 (120)
Broilers & other meat-type chickens sold [#farms (total # animals)]	- (-)	- (-)
Total Cropland [#farms (total acres)]	61 (2,002)	19 (2,704)
Corn for grain [#farms (total acres)]	11 (276)	- (-)
Wheat for grain [#farms (total acres)]	- (-)	- (-)
Corn for silage [#farms (total acres)]	- (-)	- (-)

D = Withheld by USDA to avoid disclosing data for individual farms.

- = No data.

### 5.2.3 Kentucky No Discharge Operating Permit (KNDOP)

As stated in 401 KAR 5:005, facilities with agricultural waste handling systems or that dispose of their effluent by spray irrigation but do not discharge to surface waters are required to obtain a KNDOP from the KDOW prior to construction and operation. These operations handle liquid waste in a storage component of the operation (e.g. lagoon, pit, or tank) and land apply the waste via spray irrigation or injection to cropped acreages. Land application of the waste that results in

runoff to a stream is prohibited. Facilities that handle animal waste as a liquid are required to submit a Short Form B, construction plans, and a Comprehensive Nutrient Management Plan to the KDOW. Also included in KNDOP requirements are golf courses which land apply treated wastewater via spray irrigation, typically from a holding pond - some industrial operations also spray-irrigate. There are no KNDOPs in the Beaver Creek watershed.

#### 5.2.4 Wildlife

Wildlife undoubtedly contribute E. coli (or fecal coliform) to the Beaver Creek watershed, noting the high percentage of forest in all subwatersheds. Table 5.3 shows the estimates of deer population and density by county in the Beaver Creek watershed, as provided by the Kentucky Department of Fish and Wildlife Resources (Kentucky Department of Fish and Wildlife Resources, 2006). Estimates on numbers of other types of animals are not available; however, there is an Elk release site in the watershed and several wildlife management areas exist as shown in Figures 5.20 and 5.21. Although wildlife contribute E. coli (or fecal coliform) to surface water, such contributions represent natural background conditions, and do not receive a reduction as part of the TMDL.

Table 5.3 Deer Density in Counties of Beaver Creek Watershed

County	Deer Per Square Mile	Total Number of Deer
Floyd	8	3,258
Knott	12	4,052

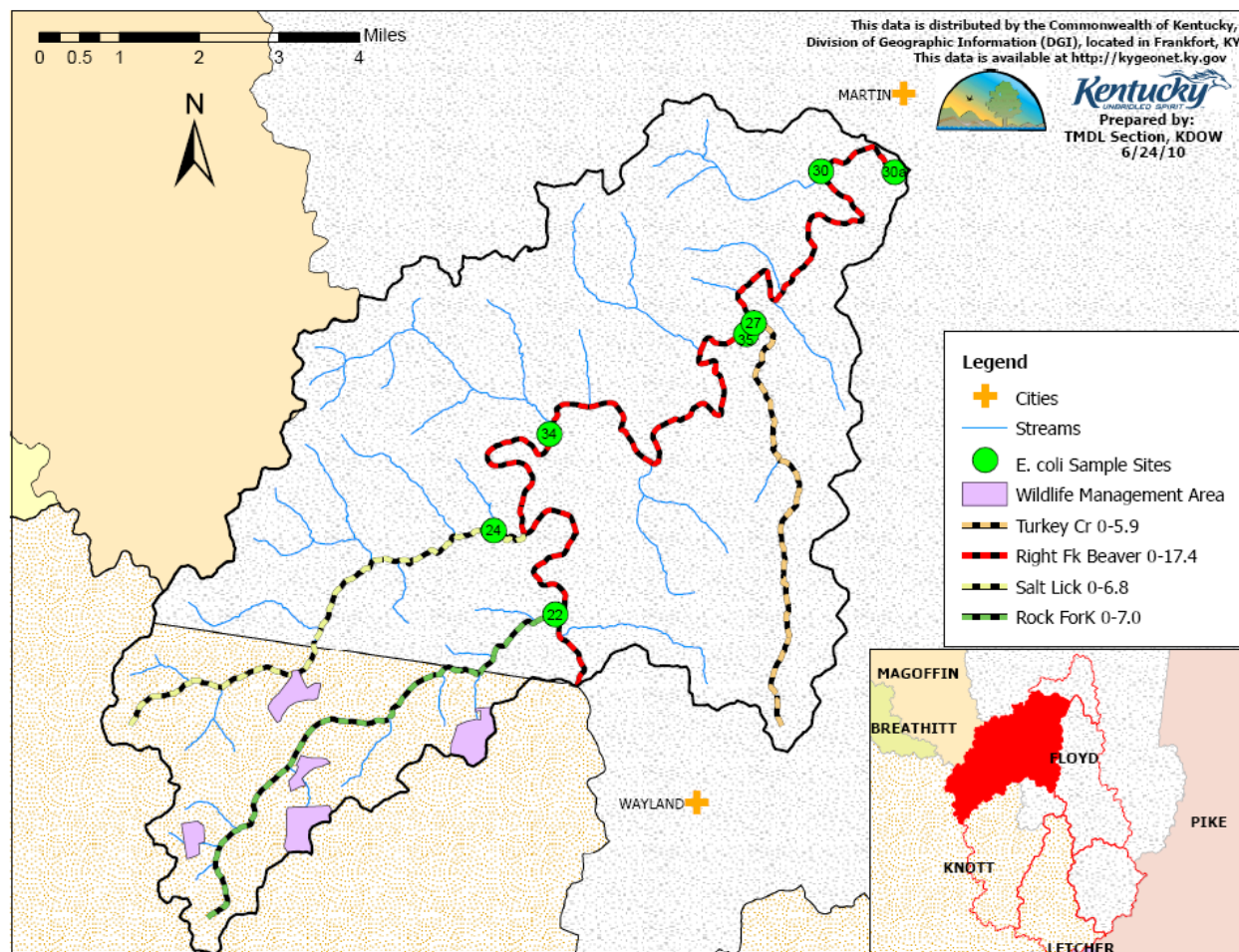


Figure 5.20 Wildlife Management Areas in the Lower Right Fork Beaver Creek Subwatershed



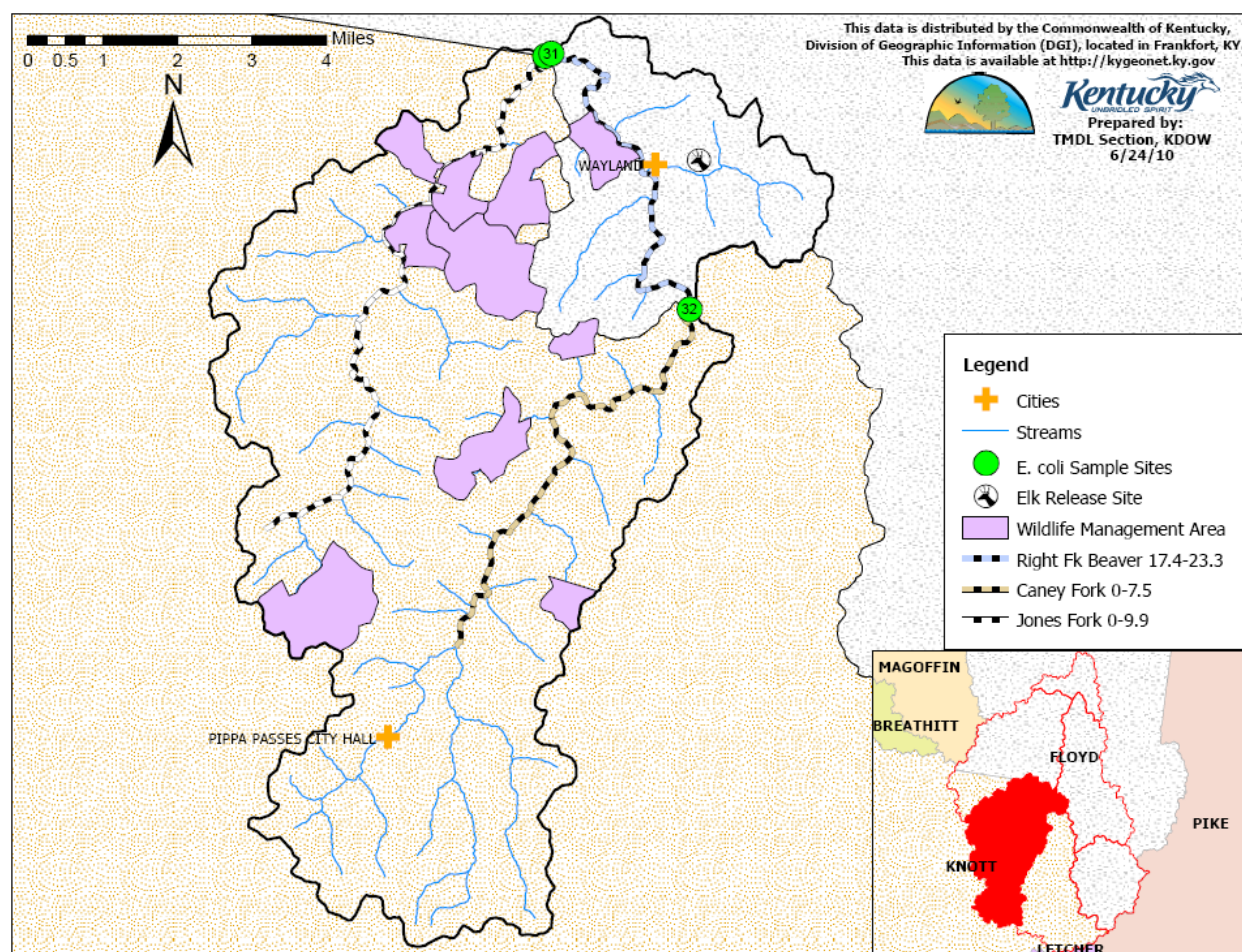


Figure 5.21 Wildlife Management areas and Elk Release Site in the Middle Right Fork Beaver Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 20 is under site 31.

### 5.2.5 Household Pets

Although household pets undoubtedly exist in these watersheds, their contribution is deemed to be minimal compared to other sources.

### 5.2.6 Illegal LA Sources

Illegal LA sources related to human waste disposal include failing septic systems, and straight pipes. Straight pipes receive a LA of 0 while failing septic tanks receive an LA equivalent to a properly functioning septic system (i.e. only the load above that of a properly functioning system receives a LA of 0). In the course of eliminating failing septic systems and straight pipes that exist in the watershed, the pollutant load carried could be routed to functional septic systems, to an existing sewage treatment plant, or possibly to a future KPDES-permitted point source such as a package treatment plant or permitted home unit for an individual residence. If routed to functional septic systems, the load will be reduced between 99% and 99.9%, after pathogen

losses in the soil column are accounted for (EPA, 2002). If routed to a KPDES-permitted source, it must conform to the requirements for these sources.

Note this Section of the TMDL is not intended to summarize the universe of potential illegal LA sources that may discharge pollutants into surface waters. Instead, it defines the illegal LA sources known to be present in this watershed (failing septic systems and straight pipes).



## 6.0 Total TMDL

The WQC in 401 KAR 10:031 (Kentucky's Surface Water Standards) for the PCR use are based on both fecal coliform bacteria and E. coli bacteria. For this TMDL, the E. coli criterion was applied as the samples were not analyzed for fecal coliform. Per 401 KAR 10:031:

*"The following criteria shall apply to waters designated as primary contact recreation use during the primary contact recreation season of May 1 through October 31: Fecal coliform content or Escherichia coli content shall not exceed 200 colonies per 100 ml or 130 colonies per 100 ml respectively as a geometric mean based on not less than five (5) samples taken during a thirty (30) day period. Content also shall not exceed 400 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period for fecal coliform or 240 colonies per 100 ml for Escherichia coli."*

Additionally:

*"The following criteria shall apply to waters designated for secondary contact recreation use during the entire year: Fecal coliform content shall not exceed 1000 colonies per 100 ml as a thirty (30) day geometric mean based on not less than five (5) samples; nor exceed 2000 colonies per 100 ml in twenty (20) percent or more of all samples taken during a thirty (30) day period."*

There are insufficient E. coli measurements to calculate a 5-sample, 30-day geometric mean, so the instantaneous criterion of 240 colonies per 100 ml was applied to calculate allowable loadings to bring the watershed into compliance with the PCR designated use. See Section 7.0 for TMDL loading calculations.

## 7.0 Methodology

A TMDL calculation (as defined in Section 1.2) is performed as follows:

$$\text{TMDL} = \text{WLA} + \text{LA} + \text{MOS}$$

The WLA has two components:

$$\text{WLA} = \text{KPDES-permitted WLA} + \text{Future Growth WLA}$$

Because E. coli colonies are expressed as a concentration, a method must be used to convert the allowable concentration of bacteria to an allowable load. Additionally, a method to divide this allowable load to sources in the watershed must be used.

The Water Quality Criteria (WQC) in 401 KAR 10:031 (Kentucky's Surface Water Standards) for the PCR use are based on both fecal coliform and E. coli bacteria. For this TMDL document, the E. coli criterion for PCR use was applied. The criterion states that E. coli shall not exceed 130 colonies/100 ml as a geometric mean based on not less than 5 samples taken during a 30-day period and shall not exceed 240 colonies/per 100 ml in 20% or more of all samples taken during a 30-day period. These limits are applicable during the recreation season of May 1 through October 31.

There are insufficient E. coli measurements to calculate a 5-sample, 30-day geometric mean, so the criterion of 240 colonies/100 ml was used as the WQC in order to calculate TMDLs to bring impaired segments into compliance with the PCR designated use. Because Kentucky has a dual standard for the PCR designated use, development of TMDLs using the E. coli criterion are sufficient to provide TMDLs for fecal coliform listed segments (i.e., development of E. coli TMDLs will protect the PCR use regardless of whether a segment is impaired for E. coli, fecal coliform, or both indicators). Additionally, because the instantaneous limit is lower for PCR than for SCR (400 colonies/ml versus 2000 colonies/ml) development of TMDLs for the PCR season also protects segments impaired for the SCR use due to fecal coliform.

### **7.1 Data Validation**

Data collected by Eastern Kentucky University for this TMDL was validated as follows:

- E. coli samples taken outside the PCR months of May through October were not considered during TMDL analysis.
- Quality Analysis/Quality Control Samples (e.g., duplicates) were not considered during TMDL analysis.
- Some samples were reported using either the *less than* (denoted using the "<") symbol or the *greater than* (denoted using the ">") symbol, indicating the true concentration was unknown but was either below or above the reported value, respectively. For these samples, the reported value was used verbatim. For *greater than* values, the exact value of the exceedance is unknown and likely higher than the number reported, however the

sample still provides insight into the status of the waterbody at the time the sample was taken.

- Only samples collected from a flowing stream were considered in analysis.
- Discharge data that consisted of velocity alone (no stream area determined) was eliminated from consideration in the analysis.
- Any discharge data that was indicated to be suspect due to possible operator error was eliminated from consideration in the analysis.

## **7.2 TMDL Components**

The TMDL calculation must take into account seasonality and other factors that affect the relationship between pollutant inputs and the ability of the stream to meet its designated uses.

### **7.2.1 Seasonality**

In Kentucky regulations, the PCR use is defined to apply to the period beginning May 1 and ending October 31. For this TMDL, seasonality is considered because samples were collected twice a month to provide data over the entire PCR season.

### **7.2.2 Critical Condition**

The critical condition for nonpoint source E. coli (or fecal coliform) loadings is typically an extended dry period followed by a rainfall runoff event. During the dry weather period, pathogen indicators build up on the land surface, and are washed off by subsequent rainfall. Conversely, the critical condition for point source loading typically occurs during periods of low stream flow when dilution is minimized. Sampling was performed during both types of conditions (during or following rain events and during extended dry periods). The Beaver Creek watershed contains both types of sources; therefore the critical condition for each impaired segment is defined by the sample showing the greatest concentration, which was generally collected during rainfall events.

### **7.2.3 Determine Mean Annual Flow**

The Pathogen TMDL SOP (KDOW, 2009) was followed to determine flows and TMDLs for this document. The USGS publishes Mean Annual Flow (MAF) data on the internet via the “Hydrology of Kentucky” geographic data explorer (<http://kygeonet.ky.gov/kyhydro/main.htm>). The MAF is calculated from multiple regression equations found in the USGS Report "Low-Flow Characteristics of Kentucky Streams" (Martin 2002). Mean Annual Flows were used to convert concentrations of E. coli into loads of E. coli. The MAF was determined at the downstream end of each impaired segment. When multiple sites were located on one impaired segment, the MAF for upstream sites was determined at the sample site location while it was determined at the end of the impaired segment for the downstream-most site. The MAF for each site was then adjusted by either adding or subtracting flow based on any KPDES-permitted dischargers of pathogen indicators or KDOW permitted stream water withdrawals in the watershed upstream of a sample site (yielding the Adjusted MAF for that site). The additions for KPDES-permitted sources of pathogen indicators were set at the design capacity (in cfs) of the facility. The subtractions for stream water withdrawals were set at the maximum permitted water withdrawal (in cfs). Water withdrawals from groundwater or from surface impoundments

was assumed not to impact in-stream flow so water withdrawals of these types were not subtracted from the MAF.

#### 7.2.4 Existing Loads

Although not a part of a TMDL, existing loads were determined using the monitoring data collected by ECU. Existing loads provide a basis by which to determine the percent reduction that would have been required to meet the TMDL limits at the time of sample collection. For each sample site, the sample with the greatest concentration of E. coli was used as the existing concentration for the site. This provides a worst-case scenario for percent reduction calculations (i.e., the percent reduction is the greatest required to bring existing loads to the TMDL loading requirements). Existing loads were calculated as:

$$\begin{array}{ccccccc} \text{Greatest} & & \text{Adjusted} & & \text{Conversion Factor} & & \\ \text{Concentration} & \times & \text{MAF} & \times & & = & \text{Existing Load (billion} \\ \text{(colonies/100ml)} & & \text{(cfs)} & & .0244657584 & & \text{colonies/day)} \end{array}$$

where the conversion factor converts cfs to ml/day and colonies to billion colonies.

#### 7.2.5 Total TMDL

The Total TMDL is the allowable loading in a watershed. Loads are portioned from this load to the MOS, WLA, and LA.

Total TMDLs were calculated for each site using the E. coli criterion of 240 colonies/100 ml:

$$\begin{array}{ccccccc} 240 & & \text{Adjusted} & & \text{Conversion Factor} & & \\ \text{(colonies/100ml)} & \times & \text{MAF} & \times & & = & \text{Total TMDL (billion} \\ & & \text{(cfs)} & & .0244657584 & & \text{colonies/day)} \end{array}$$

#### 7.2.6 Calculation of Margin of Safety

There are two methods for incorporating a MOS in the TMDL analysis: implicitly include the MOS using conservative assumptions, or explicitly set aside a (numerical) portion of the TMDL as the MOS. For this TMDL, a 10% explicit MOS (i.e., 10% of the WQC, or 24 colonies/100ml,) was set. Additionally, an implicit MOS was incorporated in loading calculations for KPDES-permitted sources by setting their flow at the maximum design capacity. The explicit MOS load for each site was calculated as:

$$\begin{array}{ccccccc} 24 & & \text{Adjusted} & & \text{Conversion Factor} & & \\ \text{(colonies/100ml)} & \times & \text{MAF} & \times & & = & \text{MOS (billion} \\ & & \text{(cfs)} & & .0244657584 & & \text{colonies/day)} \end{array}$$

### 7.2.7 Calculation of Target Load

The Target Load is defined as the load at the WQC minus the explicit MOS load. It was calculated for each site by subtracting the explicit MOS from the Total TMDL:

Target Load = Total TMDL – MOS.

It can also be calculated as:

$$\begin{array}{ccccccc} 216 & & \text{Adjusted} & & \text{Conversion Factor} & & \\ (\text{colonies}/100\text{ml}) & \times & \text{MAF} & \times & .0244657584 & = & \text{Target Load (billion} \\ & & (\text{cfs}) & & & & \text{colonies}/\text{day}) \end{array}$$

### 7.2.8 Calculation of Percent Reduction

A percent reduction is not part of the TMDL calculation, however, for informational purposes, a percent reduction was calculated for each site to show the percent reduction that would have been required at the time the samples were taken in order to meet the Target Load. The percent reduction was calculated as:

$$\text{Percent Reduction (\%)} = [(\text{Existing Load} - \text{Target Load}) / \text{Existing Load}] * 100$$

While providing additional information, the percent reduction calculation is not equivalent to the TMDL. The TMDL is the load that the waterbody can assimilate while still meeting its designated uses (i.e., PCR and SCR). The percent reduction is a determination of how much the measured concentration exceeded the Target Load at the time the samples were taken. It does not determine the percent reduction needed at any other time, as the in-stream concentrations are likely to be different. Unlike the calculated percent reductions, the TMDL is a constant based upon the WQC whereas the percent reduction changes based on in-stream concentrations.

Regardless of the procedure used to estimate percent reductions for each sampling station, reductions from existing conditions ultimately must be effected within a given watershed only until all stream segments meet the PCR use, or until all sources save wildlife are discharging in compliance with the WQC. However, once the WQC is met, all sources (save wildlife) must continue to discharge at a concentration that meets the WQC.

### 7.2.9 Calculation of WLAs for Each KPDES Permitted Source

The WLA is the allocation given to KPDES-permitted sources within the TMDL. For these sources, the WLAs are calculated based on the permitted concentration limits and facility design flow (in units of cfs) using the following equation:

$$\begin{array}{ccccccc} 240 & & \text{Design} & & \text{Conversion Factor} & & \\ (\text{colonies}/100\text{ml}) & \times & \text{Flow} & \times & .0244657584 & = & \text{WLA (billion} \\ & & (\text{cfs}) & & & & \text{colonies}/\text{day}) \end{array}$$



The design capacity in MGD was converted to cfs by multiplying by 1.54723 to convert days to seconds and million gallons to cubic feet.

### 7.2.10 Calculation of Remainder

The Remainder is not part of the TMDL; however, it is used in the TMDL calculations. It is determined as the Target Load minus the sum of all WLAs for KPDES-permitted sources.

### 7.2.11 Calculation of Future Growth WLA

Because the WLA must account for all KPDES-permitted sources, TMDLs will often account for future growth of these sources (i.e., an increase in the number of KPDES-permitted sources or in the loading per discharger) in order to avoid having to re-open the TMDL and change the WLA when new or expanding sources come online. Future growth is represented by a portion of the TMDL Target which is set aside (i.e., is not part of the LA nor is it part of the WLA for current/known sources). It can also account for existing storm water sources which are later discovered to discharge the pollutant of concern, even though this fact was not known at the time the TMDL was written. Of course, any and all of the sources mentioned above must meet the WQC and KDOW's permitting requirements. The amount set aside for future growth is determined by the following formula, which assumes that growth occurs more rapidly in developed areas (which is determined by the sum of developed open space, developed low intensity, developed medium intensity and developed high intensity areas) than in rural areas:

Table 7.1 Future Growth WLA Formula

Percent Developed Area in the Subwatershed	% of Remainder Set Aside for Future Growth WLA
≥25%	5%
≥20% – <25%	4%
≥15% – <20%	3%
≥10% – <15%	2%
≥5% – <10%	1%
<5%	0.5%

The Future Growth WLA is calculated as the Remainder multiplied by the appropriate percentage from Table 7.1.

Future Growth WLA = Remainder \* Future Growth WLA percentage

### 7.2.12 Calculation of LA

The LA is where non-KPDES-permitted sources (e.g., nonpoint sources, or those sources not permitted by KPDES) receive their allocation within the TMDL. Non-KPDES-permitted sources include non-KPDES permitted OSTDS (i.e. septic systems), wildlife, household pets and facilities (e.g., farms, landfarms for municipal STP sludge) with properly functioning BMPs. Facilities with failing or non-existing BMPs as well as failing septic systems are also included in the LA, but these are illegal sources and KDOW expects compliance efforts to target these sources for elimination so that legally operating sources do not bear the burden of implementing reductions beyond achieving the WQC in order to accommodate the loading from illegal sources. Load Allocations are calculated for each site as follows:

LA= Remainder – Future Growth WLA.

The available sampling data were insufficient to apportion the existing loading among the various LA sources; therefore, it is lumped to all LA sources.

### **7.3 Determining TMDL for Impaired Segment**

If there was only one sample site on an impaired segment, the TMDL for that site is the TMDL for the impaired segment. There were a few cases where multiple sites were sampled on one impaired segment. When this occurred, the TMDL was determined using the MAF from the downstream station, while the existing condition and percent reduction were determined by the greatest exceedance (see Section 7.2.4). Note that the TMDL, WLAs, MOS, LA, and Future Growth WLA for the downstream-most site do not change by inserting this greatest exceedance into calculations for the downstream-most site, only the existing load and percent reduction change. This is because TMDLs were determined by the WQC for E. coli, not by the sample data that were collected. In other words, the WQC determines where the stream needs to be while the sample data determines how far it has to go to get there.

### **7.4 Additional Calculations**

In addition to TMDL calculations, calculations of instantaneous loads and unit area loads were performed on the sample data. This provides information about actual loadings observed in the watershed at the time of sampling. Instantaneous loads were calculated on each sample result (if flow was also measured) as follows:

$$\begin{array}{ccccccc} \text{Observed } \underline{\text{E.}} & & \text{Observed} & & \text{Conversion Factor} & & \text{Instantaneous Load} \\ \underline{\text{coli}} & & \text{Flow} & & & & \text{(billion colonies/day)} \\ \text{Concentration} & \times & \text{(cfs)} & \times & .0244657584 & = & \\ \text{(colonies/100ml)} & & & & & & \end{array}$$

These instantaneous loads were then converted to unit area loads in million colonies/day/acre by dividing by the watershed area (in acres) and multiplying by 1000 to convert from billion colonies/day to million colonies/day. This provides information about how much load is coming from each acre of land in the subwatershed above the sample site. This varies as the E. coli

concentration changes across sample dates. By comparing unit area loads across sites on one sample date, subwatersheds that contribute greater loadings of bacteria can be identified (see unit area load results in Appendix D).

## **8.0 TMDLs for Individual Stream Segments**

In order to group the subwatersheds affected by this TMDL report in a logically progressive way, an analysis of impaired segments is presented beginning at the headwaters of the Left Fork moving downstream to its mouth, the headwaters of the Right Fork moving downstream to its mouth, then progressing downstream on Beaver Creek.

Descriptions of each impaired subwatershed are presented along with tables of land cover, general subwatershed information, sample data, water withdrawals (if any), and TMDL allocations. The land cover table for each segment includes the percentage used to calculate the Future Growth WLA. The Waterbody Identification number (WBID) is included in the table of general information about the impaired segment. This number is a unique identifier assigned to all assessed waters in KY.

The TMDL tables include KPDES-permitted source information and TMDL allocations and can be interpreted as follows:

The columns with the blue highlight indicate the TMDL allocations. The rows with green highlight indicate KPDES permit information and the design capacity (in cfs) that feeds into the WLA calculation for each KPDES-permitted source. The WLA (in blue) for a particular KPDES-permitted source is on the same row as the information for the KPDES-permitted source (in green). The purple highlight indicates the sum of KPDES flow inputs that were added to the MAF of each site.

For segments with multiple sample sites, only the TMDL table for the impaired segment is shown in Section 8. However, TMDL tables for the additional sites are shown in Appendix E.

### 8.1 Caleb Fork RM 0.0 to 1.2

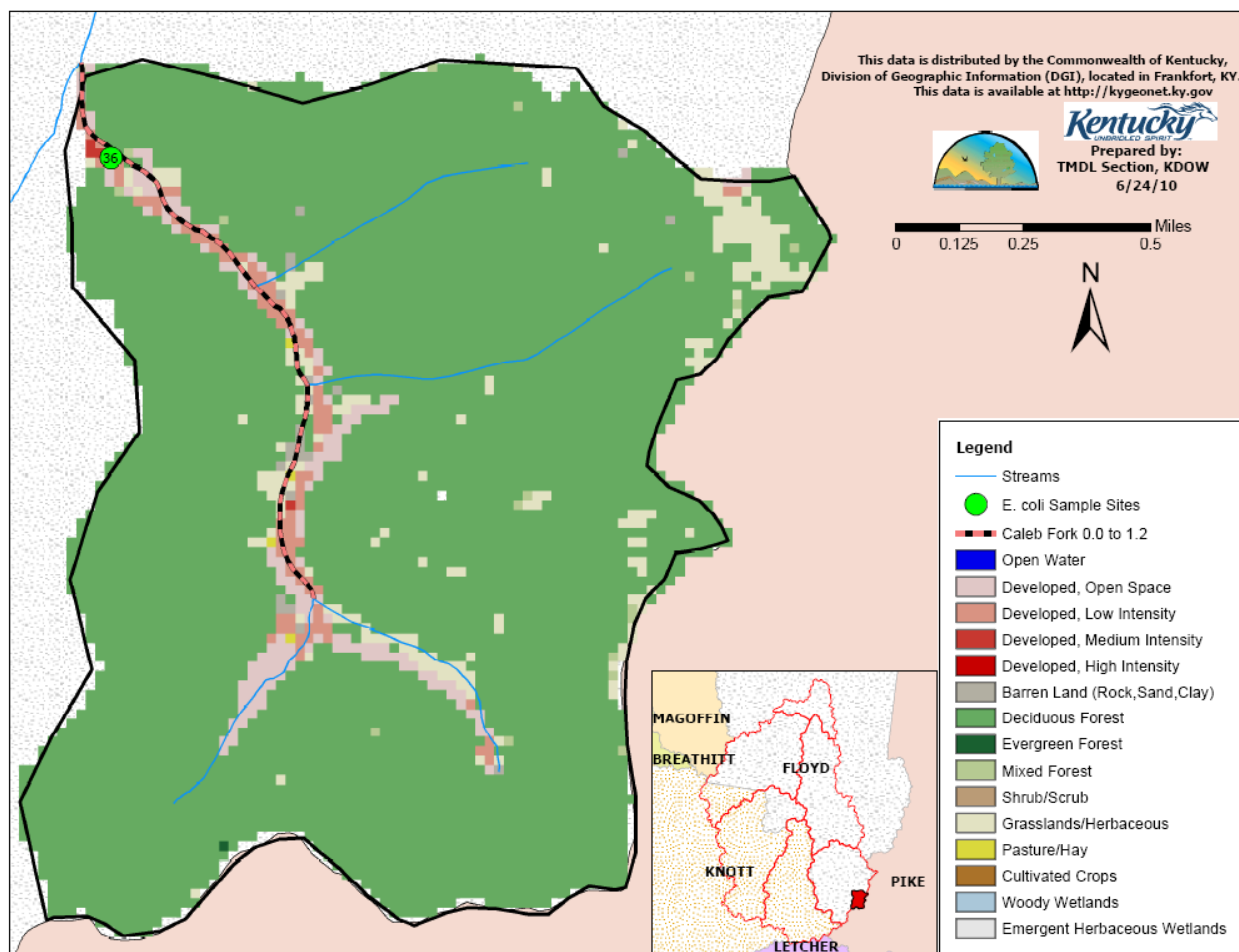


Figure 8.1 Caleb Fork RM 0.0 to 1.2

Caleb Fork is a second order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.1). Information about Caleb Fork, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.1. The WBID number for all sites is a unique identifier issued by the Division of Water for all assessed segments. It is based upon the USGS Geographic Names Information System (USGS, 1999) with a KY in front of the GNIS number and a \_## where ## is a segment identification number. To save space, the KY has been left off the beginning of the WBID #. Caleb Fork has a catchment of 1,220 acres (1.9 square miles) with a 90% forested and 4.8 % developed land cover (Table 8.2). This subwatershed is entirely un-sewered. This subwatershed has neither KPDES-permitted pathogen dischargers nor water withdrawals. Sampling data from site 36 is presented in Table 8.3, and the TMDL allocations in Table 8.4.



Table 8.1 Caleb Fork RM 0.0 to 1.2 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Caleb Fork	Caleb Fork 0.0 to 1.2	488598_01	Floyd	1220.19	1.907	2nd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
36	36	0.2	37.32805	-82.6898	2.7	0	0	0	2.7

Table 8.2 Caleb Fork RM 0.0 to 1.2 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	58.31	0.09	4.78	0.5
Barren Land	5.12	0.01	0.42	
Forest/Shrubland	1108.03	1.73	90.81	
Grassland/Herbaceous	47.85	0.07	3.92	
Pasture/ Hay	0.89	0.00	0.07	
Cultivated Crops	0.00	0.00	0.00	
Wetlands	0.00	0.00	0.00	
Total	1220.19	1.91	100.00	

Table 8.3 Caleb Fork RM 0.0 to 1.2 Data (Site 36)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	11000	1.085	292.00	239.31
05/30/08	17000	4.3302	1801.01	1476.01
06/13/08	3400	N/A	N/A	N/A
6/13/08 (QA Sample)	2900	N/A	N/A	N/A
06/27/08	3000	0.326	23.93	19.61
07/11/08	5300	N/A	N/A	N/A
07/31/08	17000	0.308	128.10	104.99
08/08/08	3600	0.260	22.90	18.77
08/22/08	800	0.07	1.37	1.12
09/12/08	2600	0.1	6.36	5.21
09/20/08	5000	0.0334	4.09	3.35
10/17/08	>80000	0.211	412.98	338.46
10/24/08	240	0.088	0.52	0.42
Greatest Concentration	80000			

Table 8.4 TMDL Calculations for Caleb Creek RM 0.0-1.2

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					5284.6038	Existing Load
					<b>15.8538</b>	<b>Total TMDL</b>
					<b>1.5854</b>	<b>MOS</b>
					14.2684	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.73	% reduction
N/A	N/A	N/A	N/A	N/A	<b>0.0000</b>	<b>KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.00	14.2684	remainder
					<b>0.0713</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.0713</b>	<b>Total WLA</b>
					<b>14.1971</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

## 8.2 Clear Creek RM 0.0 to 4.9

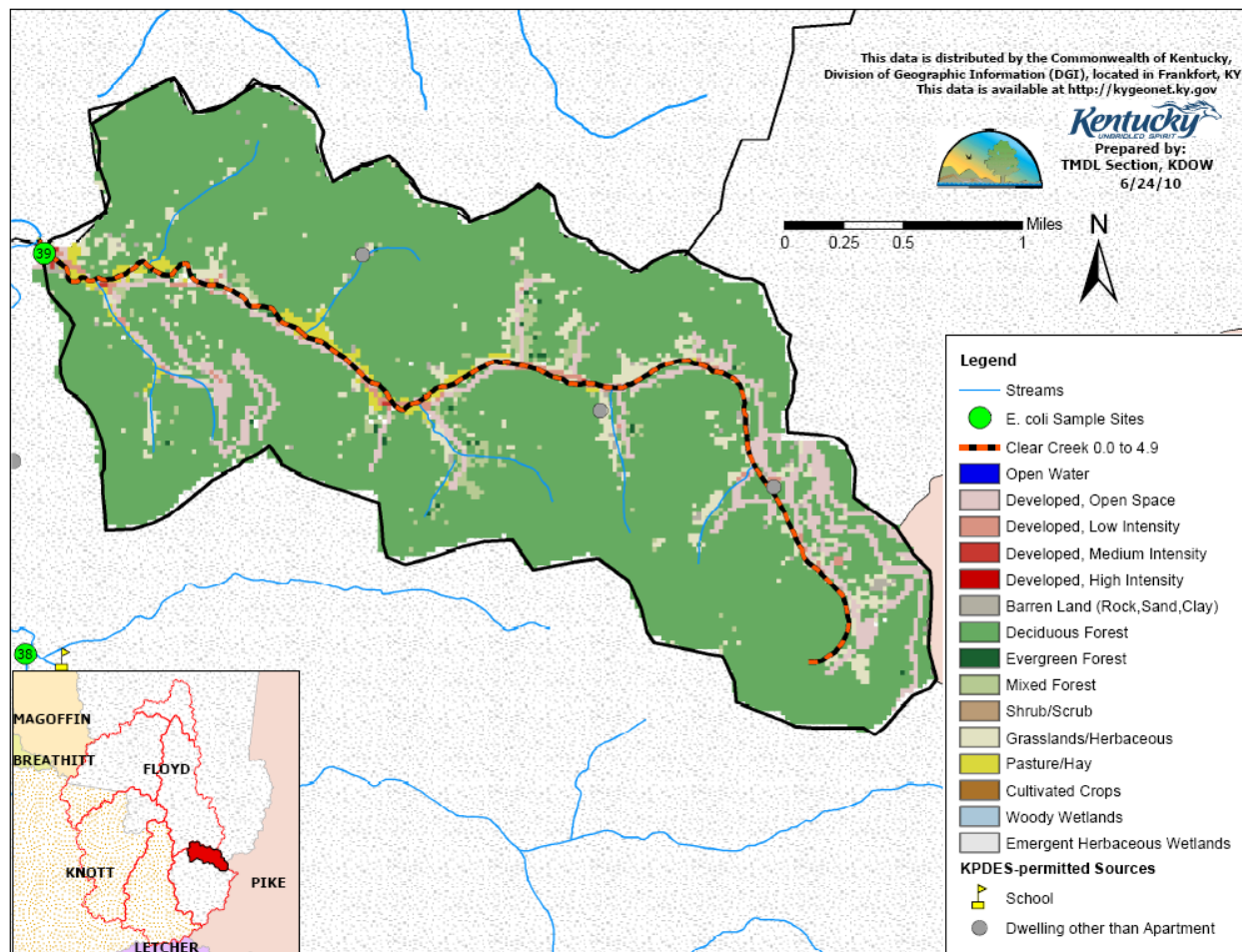


Figure 8.2 Clear Creek RM 0.0 to 4.9

Clear Creek is a third order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.2). Information about Clear Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.5. It has a catchment of 3,308 acres (5.2 square miles) with an 86% forested and 7% developed land cover (Table 8.6). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 39 is presented in Table 8.7 and TMDL allocations in Table 8.8.

Table 8.5 Clear Creek RM 0.0 to 4.9 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Clear Creek	Clear Creek 0.0 to 4.9	489611_01	Floyd	3307.66	5.17	3rd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
39	39	0.05	37.38850	-82.73075	7.1	0	0.00232	0	7.1023

Table 8.6 Clear Creek RM 0.0 to 4.9 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	231.83	0.36	7.01	1.0
Barren Land	22.25	0.03	0.67	
Forest/Shrubland	2836.22	4.43	85.75	
Grassland/Herbaceous	170.64	0.27	5.16	
Pasture/Hay	46.05	0.07	1.39	
Cultivated Crops	0.44	0.00	0.01	
Wetlands	0.22	0.00	0.01	
Totals	3307.66	5.17	100.00	

Table 8.7 Clear Creek RM 0.0 to 4.9 Data (Site 39)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	200	1.045	5.11	1.55
05/30/08	220	0.9205	4.95	1.50
06/13/08	710	1.003	17.42	5.27
06/27/08	310	0.625	4.74	1.43
6/27/08 (QA Sample)	330	N/A	N/A	N/A
07/11/08	330	0.692	5.59	1.69
07/31/08	>80000	8.345	16333.34	4938.03
7/31/08 (QA Sample)	31000	N/A	N/A	N/A
08/08/08	290	0.491	3.48	1.05
08/22/08	470	0.322	3.70	1.12
09/12/08	1800	0.656	28.89	8.73
09/20/08	320	0.1716	1.34	0.41
10/17/08	280	0.484	3.32	1.00
10/24/08	120	0.184	0.54	0.16
Greatest Concentration	80000			

Table 8.8 TMDL for Clear Creek RM 0.0-4.9

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					13901.0933	Existing Load
					<b>41.7033</b>	<b>Total TMDL</b>
					<b>4.1703</b>	<b>MOS</b>
					37.5330	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.73	% reduction
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.0136</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0023208	37.5193	remainder
					<b>0.3752</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.3888</b>	<b>Total WLA</b>
					<b>37.1441</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



### 8.3 Jacks Creek RM 0.0 to 4.4

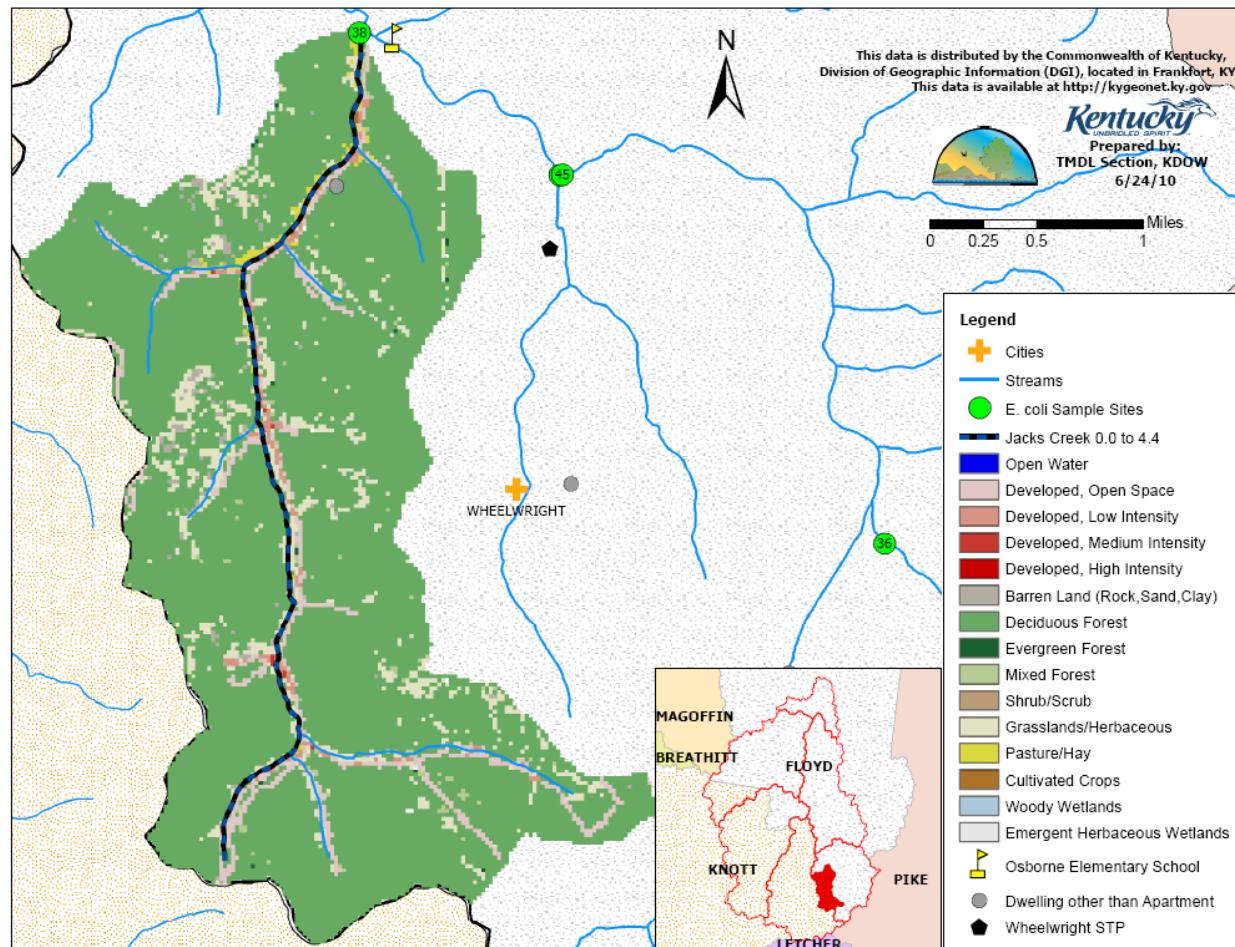


Figure 8.3 Jacks Creek RM 0.0 to 4.4

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

Jacks Creek is a third order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.3). Information about Jacks Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.9. It has a catchment of 3,721 acres (5.8 square miles) with an 86% forested and 5.4% developed land cover (Table 8.10). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 38 is presented in Table 8.11 and TMDL allocations in Table 8.12.

Table 8.9 Jacks Creek RM 0.0 to 4.4 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Jacks Creek	Jacks Creek 0.0 to 4.4	495089_01	Floyd	3721.05	5.81	3rd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
38	38	0.1	37.36347	-82.73338	8.1	0	0.00077	0	8.1008

Table 8.10 Jacks Creek RM 0.0 to 4.4 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	200.75	0.31	5.39	1.0
Barren Land	40.24	0.06	1.08	
Forest	3187.95	4.98	85.67	
Grassland/Herbaceous	257.88	0.40	6.93	
Pasture/Hay	32.46	0.05	0.87	
Cultivated Crops	1.56	0.00	0.04	
Wetlands	0.22	0.00	0.01	
Totals	3721.05	5.81	100.00	

Table 8.11 Jacks Creek RM 0.0 to 4.4 Data (Site 38)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	480	2.623	30.80	8.28
05/30/08	700	17.677	302.74	81.36
06/13/08	1000	1.3287	32.51	8.74
06/27/08	3700	1.027	92.97	24.98
07/11/08	450	1.026	11.29	3.03
07/31/08	9000	4.856	1069.25	287.35
08/08/08	520	1.164	14.81	3.98
08/22/08	180	0.714	3.14	0.85
09/12/08	1800	2.853	125.64	33.77
09/20/08	560	1.215	16.65	4.47
10/17/08	600	0.642	9.42	2.53
10/17/08 (QA Sample)	800	N/A	N/A	N/A
10/24/08	90	0.397	0.87	0.23
10/24/08 (QA Sample)	180	N/A	N/A	N/A
Greatest Concentration	9000			

Table 8.12 TMDL for Jacks Creek RM 0.0 to 4.4

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					1783.7241	Existing Load
					<b>47.5660</b>	<b>Total TMDL</b>
					<b>4.7566</b>	<b>MOS</b>
					42.8094	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	97.60	% reduction
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.000774	42.8048	remainder
					<b>0.4280</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.4325</b>	<b>Total WLA</b>
					<b>42.3768</b>	<b>LA</b>

Note:

<sup>(1)</sup> Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

#### 8.4 Otter Creek RM 0.0 to 0.5

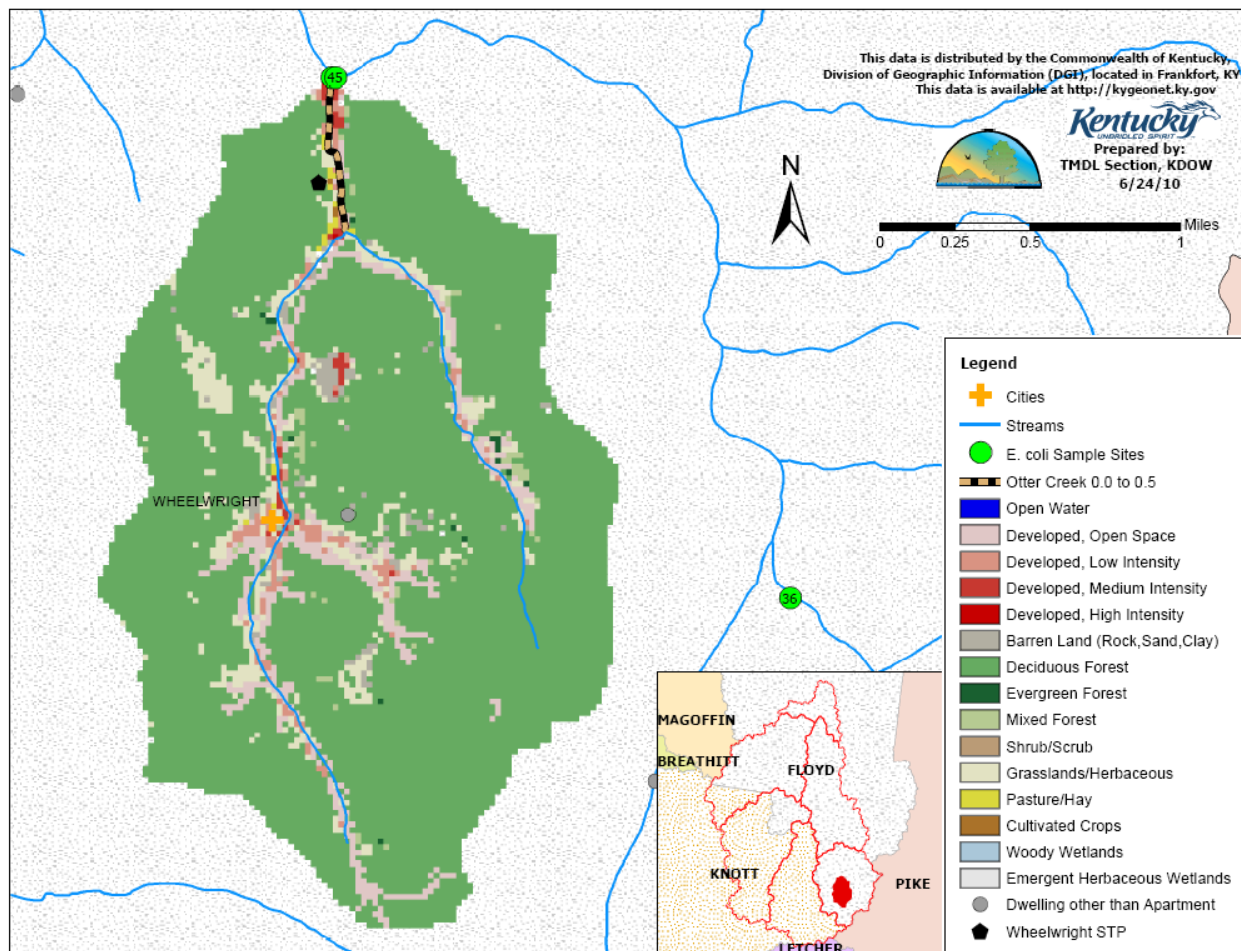


Figure 8.4 Otter Creek RM 0.0 to 0.5

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

Otter Creek is a second order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.4). Information about Otter Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.13. It has a catchment of 2,123 acres (3.3 square miles) with an 85% forested and 7.4% developed land cover (Table 8.14). This subwatershed is partially sewered around the city of Wheelwright (see Figure 8.5). There are no stream water withdrawals in this subwatershed. Sampling data from site 37 is presented in Table 8.15 and TMDL allocations in Table 8.16.

Table 8.13 Otter Creek RM 0.0 to 0.5 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Otter Creek	Otter Creek 0.0 to 0.5	KY500021_01	Floyd	2123.24	3.32	2nd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
37	37	0.05	37.35389	-82.71650	4.6	0	0.34890	0.00000	4.9489

Table 8.14 Otter Creek RM 0.0 to 0.5 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	157.33	0.25	7.41	1.0
Barren Land	29.55	0.05	1.39	
Forest/Shrubland	1807.92	2.82	85.15	
Grassland/Herbaceous	122.66	0.19	5.78	
Pasture/Hay	4.89	0.01	0.23	
Cultivated Crops	0.67	0.00	0.03	
Wetlands	0.22	0.00	0.01	
Totals	2123.24	3.32	100.00	

Table 8.15 Otter Creek RM 0.0 to 0.5 Data (Site 37)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	6000	1.461	214.47	101.01
05/30/08	38000	6.935	6447.46	3036.61
06/13/08	2000	1.1368	55.63	26.20
06/27/08	490	0.744	8.92	4.20
07/11/08	2700	1.787	118.04	55.60
07/31/08	>80000	1.959	3834.27	1805.86
08/08/08	730	0.931	16.63	7.83
08/22/08	570	0.224	3.12	1.47
09/12/08	2900	0.875	62.08	29.24
09/20/08	>80000	0.3732	730.45	344.03
10/17/08	2400	0.417	24.49	11.53
10/24/08	250	0.289	1.77	0.83
Greatest Concentration	80000			



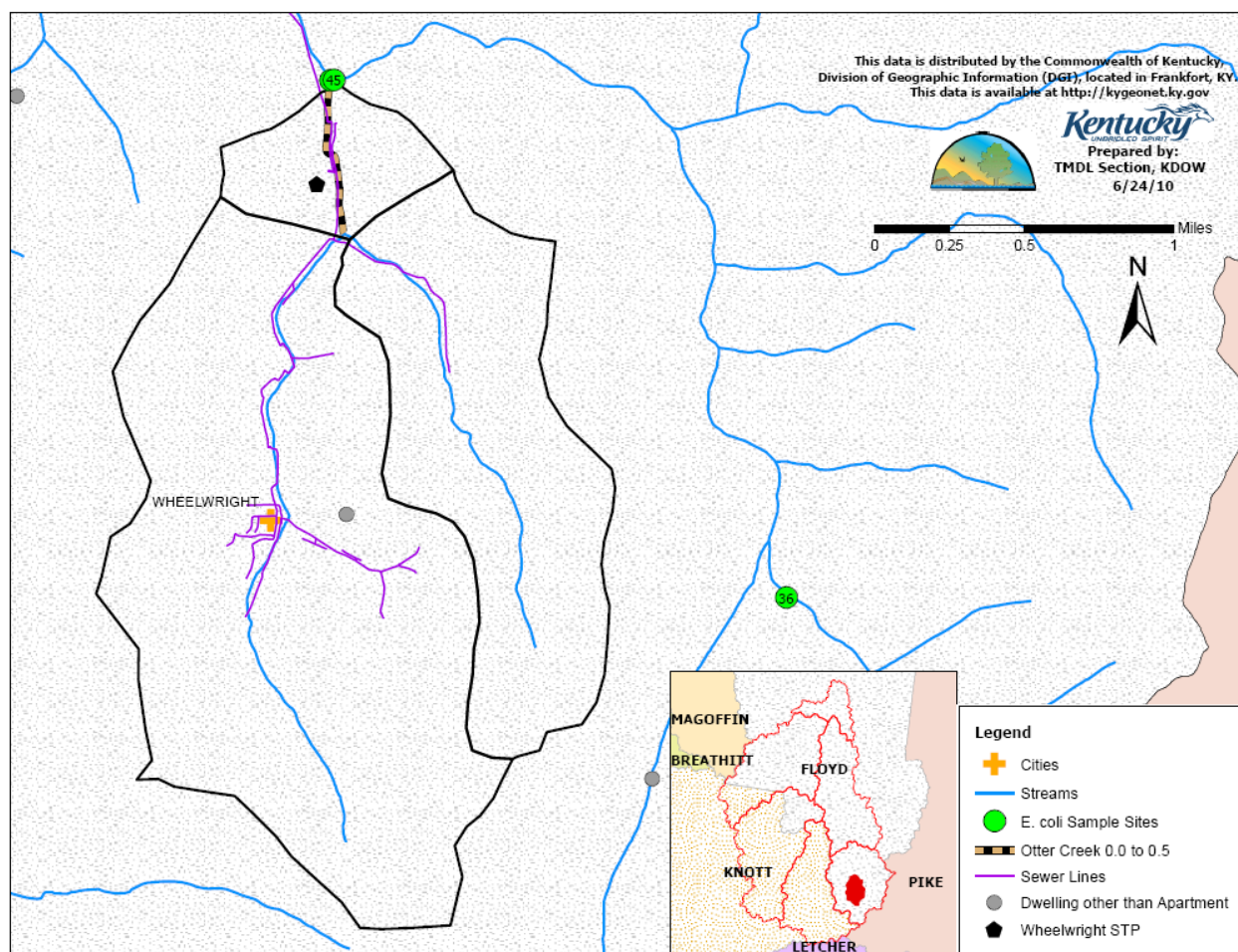


Figure 8.5 Sewer Lines in Otter Creek Subwatershed

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.



Table 8.16 TMDL for Otter Creek RM 0.0 to 0.5

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					9686.2876	Existing Load
					<b>29.0589</b>	<b>Total TMDL</b>
					<b>2.9059</b>	<b>MOS</b>
					26.1530	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.73	% reduction
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.348126525	<b>2.0441</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>2.0486</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.34890014	24.1043	remainder
					<b>0.2410</b>	<b>Future Growth WLA <sup>(1)</sup></b>
					<b>2.2896</b>	<b>Total WLA</b>
					<b>23.8633</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.5 Left Fork Beaver Creek RM 18.7 to 28.6

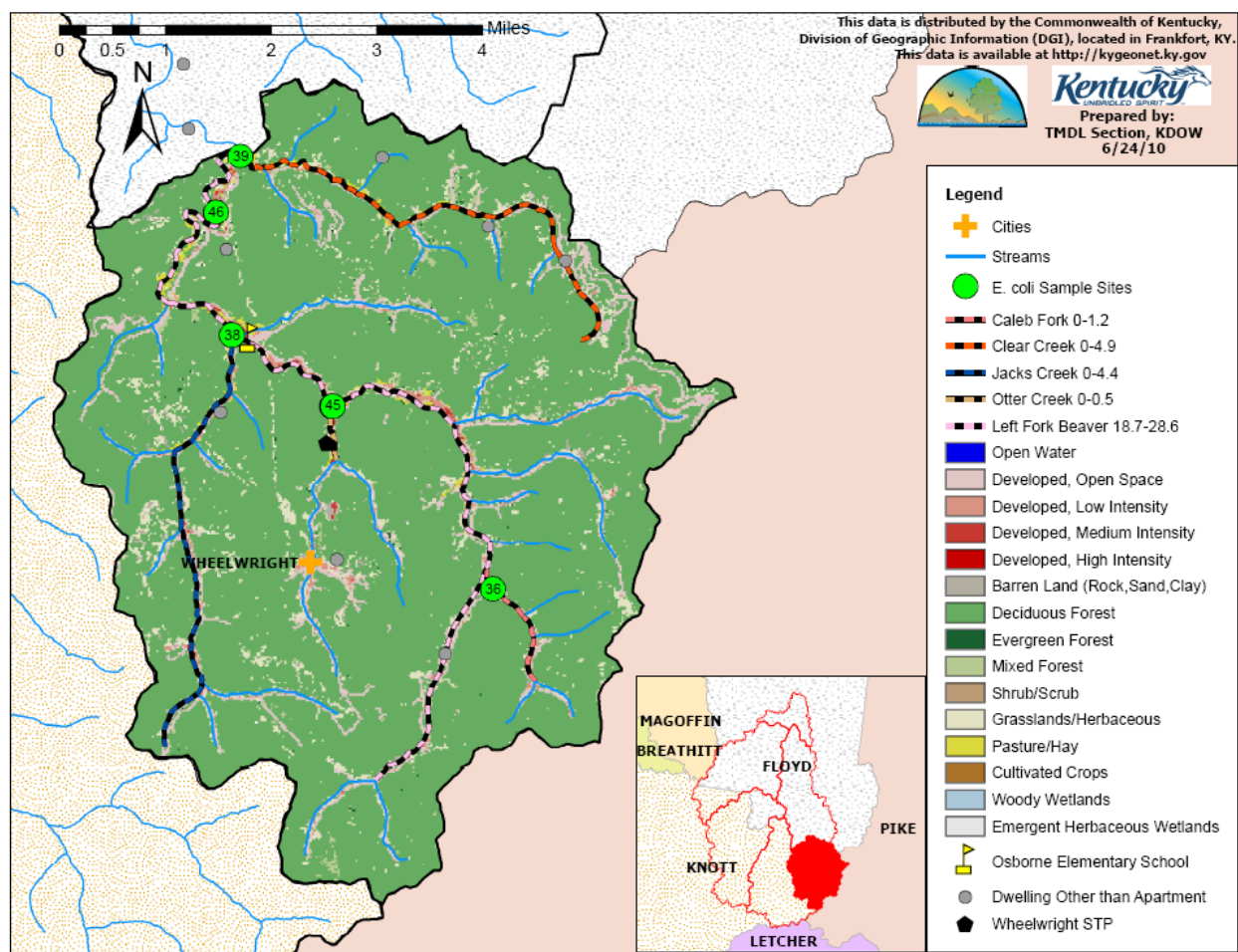


Figure 8.6 Left Fork Beaver Creek RM 18.7 to 28.6

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

The Left Fork Beaver Creek at RM 18.7 is a fourth order stream located in Floyd County. Its subwatershed is identical to the Upper Left Fork Beaver Creek subwatershed (Figure 8.6). Information about this subwatershed, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.17. It has a catchment of 7,019 acres (11 square miles) with an 87% forested and 6.9% developed land cover (Table 8.18). Portions of this subwatershed are sewered around the city of Wheelwright (see Figure 5.18). There are no stream water withdrawals in this subwatershed. This segment had two sample sites and data from sites 45 and 46 is presented in Table 8.19. Because both sites had the same greatest concentration ( $>80,000$ ), the downstream-most site (site 46) was used to set the TMDL. The TMDL calculations for site 45 are shown in Appendix E. The TMDL for Left Fork Beaver RM 18.7 to 28.6 (site 46) is shown in Table 8.20.

Table 8.17 Left Fork Beaver Creek RM 18.7 to 28.6 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Left Fork Beaver Creek	Left Fork Beaver Creek 18.7 to 28.6	496194_04	Floyd	7019.46	10.97	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
45	45	23.4	37.35390	-82.71630	15.4	23.4	0.00077	0.00000	15.4008
46	46	19.6	37.38095	82.73524	35	18.7	0.38495	0.00000	35.3850

Table 8.18 Left Fork Beaver Creek RM 18.7 to 28.6 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	482.05	0.75	6.87	1.0
Barren Land	59.62	0.09	0.85	
Forest/ Shrubland	6114.97	9.55	87.11	
Grassland/Herbaceous	332.34	0.52	4.73	
Pasture/ Hay	29.36	0.05	0.42	
Cultivated Crops	0.89	0.00	0.01	
Wetlands	0.22	0.00	0.00	
Totals	7019.46	10.97	100.00	

Table 8.19 Left Fork Beaver Creek RM 18.7 to 28.6 Data (Sites 45 and 46)

Site 45				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	3900	4.395	419.36	59.74
05/30/08	1400	21.576	739.02	105.28
06/13/08	2500	0.138	8.44	1.20
06/27/08	580	1.103	15.65	2.23
07/11/08	310	0.555	4.21	0.60
07/31/08	>80000	5.316	10404.80	1482.28
08/08/08	740	0.689	12.47	1.78
08/22/08	600	0.508	7.46	1.06
09/12/08	30000	0.520	381.67	54.37
09/20/08	2000	0.158	7.73	1.10
10/17/08	6800	0.958	159.38	22.71
10/24/08	860	0.433	9.11	1.30
10/24/08 (QA Sample)	390	N/A	N/A	N/A
Greatest Concentration	80000			
Site 46				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	800	8.799	172.22	10.66
05/30/08	290	72.576	514.93	31.86
06/13/08	130	5.353	17.03	1.05
06/27/08	90	2.727	6.00	0.37
07/11/08	130	3.555	11.31	0.70
07/31/08	>80000	23.673	46334.23	2867.24
7/31/08 (QA Sample)	17000	N/A	N/A	N/A
08/08/08	170	4.089	17.01	1.05
08/22/08	30	1.406	1.03	0.06
09/12/08	1100	3.633	97.77	6.05
09/20/08	30	1.2618	0.93	0.06
9/20/08 (QA Sample)	50	N/A	N/A	N/A
10/17/08	90	2.10	4.62	0.29
10/24/08	130	1.057	3.36	0.21
Greatest Concentration	80000			

Table 8.20 TMDL for Left Fork Beaver Creek RM 18.7 to 28.6

TMDL Table					<u>E. coli</u> (billion colonies/day)	
Site 46					69257.5721	Existing Load
					<b>207.7727</b>	<b>Total TMDL</b>
					<b>20.7773</b>	<b>MOS</b>
					186.9954	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.73	% reduction
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.3481265	<b>2.0441</b>	<b>KPDES WLA</b>
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.0105212	<b>0.0618</b>	<b>KPDES WLA</b>
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.0232084	<b>0.1363</b>	<b>KPDES WLA</b>
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>2.2603</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.3849506	184.7351	remainder
					<b>1.8474</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>4.1077</b>	<b>Total WLA</b>
					<b>182.8877</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

## 8.6 Frasure Creek RM 0.0 to 5.2

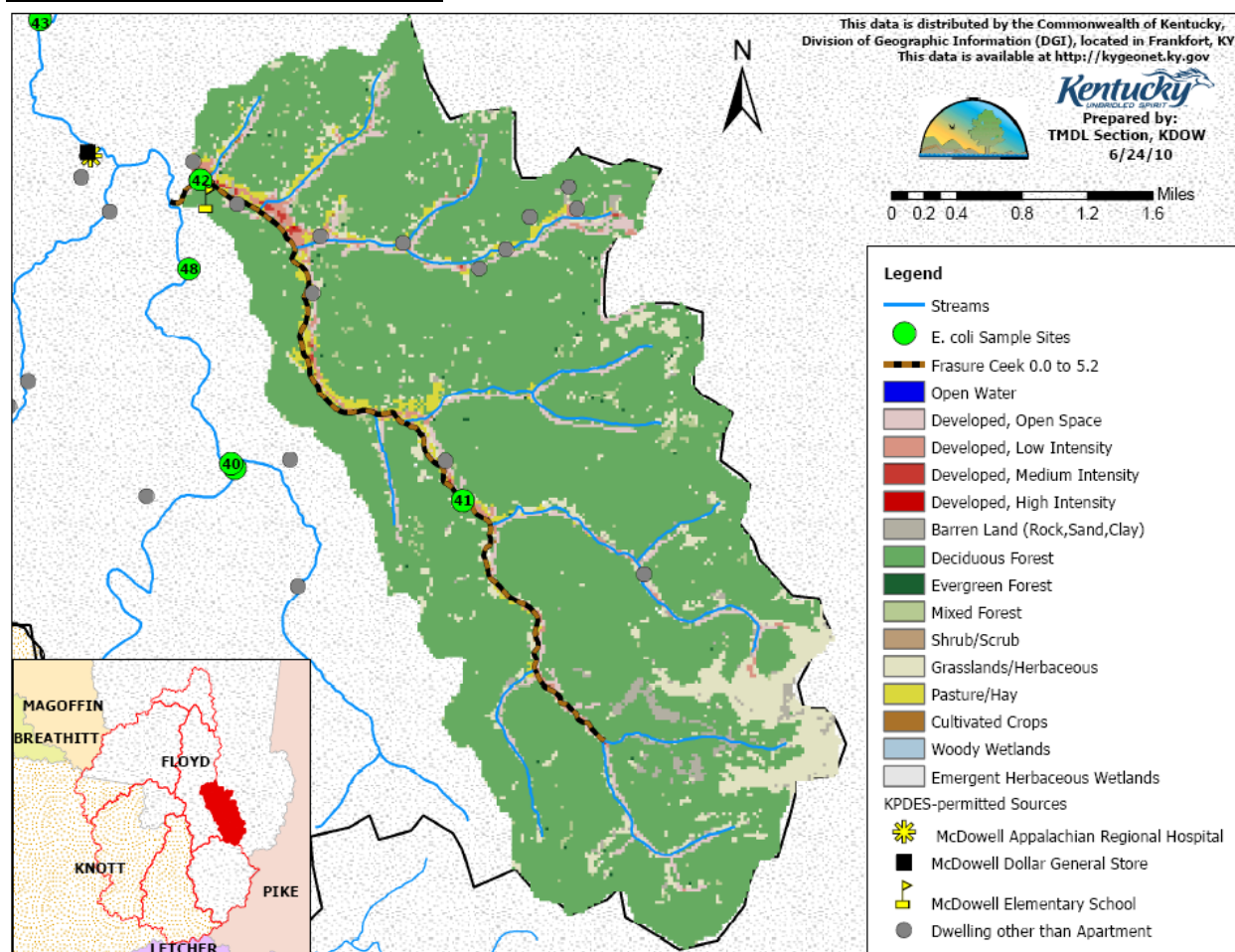


Figure 8.7 Frasure Creek RM 0.0 to 5.2

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

Frasure Creek is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.7). Information about Frasure Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.21. It has a catchment of 7,360 acres (11.5 square miles) with an 83% forested and 5.1% developed land cover (Table 8.22). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. This segment had two sample sites and data from sites 41 and 42 is presented in Table 8.23. Site 41 had the greatest concentration (71,000) so this concentration was used to set the existing loads and percent reduction for the impaired segment. However, to extrapolate to the end of the impaired segment, the Adjusted MAF from site 42 (15.6325 cfs) was used as the flow to set the TMDL for this impaired segment. The TMDL calculations for site 41 and 42 are shown in Appendix E while the TMDL for Frasure Creek RM 0.0 to 5.2 is shown in Table 8.24.



Table 8.21 Frasure Creek RM 0.0 to 5.2 Subwatershed Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Frasure Creek	Frasure Creek 0.0 to 5.2	492466_01	Floyd	3494.33	5.46	3rd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
41	41	3.25	37.42650	-82.70880	7.6	3.25	0.00077	0.00000	7.6008
42	42	0.25	37.45560	-82.73680	15.6	0	0.03249	0.00000	15.6325

Table 8.22 Frasure Creek RM 0.0 to 5.2 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	376.21	0.59	5.11	1.0 <sup>(1)</sup>
Barren Land	115.46	0.18	1.57	
Forest/Shrubland	6099.62	9.53	82.87	
Grassland/Herbaceous	611.81	0.96	8.31	
Pasture/ Hay	151.51	0.24	2.06	
Cultivated Crops	5.56	0.01	0.08	
Wetlands	0.00	0.00	0.00	
Totals	7360.17	11.50	100.00	

<sup>(1)</sup> Note: The subwatershed upstream of Site 41 had 3.4% of its total area in the developed land cover category so 0.5% was used to determine the Future Growth WLA in the TMDL calculations for Site 41.

Table 8.23 Frasure Creek RM 0.0 to 5.2 Data (Sites 41 and 42)

Site 41				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	2000	N/A	N/A	N/A
05/30/08	1600	0.9202	36.02	10.31
06/13/08	170	0.3155	1.31	0.38
06/27/08	450	0.29	3.19	0.91
07/31/08	71000	18.8592	0.00	0.00
08/08/08	1700	0.474	32759.73	9375.11
8/8/08 (QA Sample)	360	N/A	19.71	5.64
09/12/08	13000	0.7636	N/A	N/A
09/20/08	1000	0.391	242.87	69.50
Greatest Concentration	71000 <sup>(1)</sup>		9.57	2.74
Site 42				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	160	N/A	N/A	N/A
05/30/08	400	1.3342	13.06	1.77
06/13/08	570	6.321	88.15	11.98
06/27/08	560	0.8631	11.83	1.61
07/31/08	43000	N/A	N/A	N/A
08/08/08	440	0.588	6.33	0.86
08/22/08	900	0.116	2.55	0.35
8/22/08 (QA Sample)	1100	N/A	N/A	N/A
09/12/08	3300	0.709	57.24	7.78
9/12/08 (QA Sample)	3600	N/A	N/A	N/A
09/20/08	1900	0.256	11.90	1.62
10/17/08	3200	0.476	37.27	5.06
10/24/08	760	0.211	3.92	0.53
Greatest Concentration	43000			

Note: <sup>(1)</sup> Indicates concentration used to set existing load and percent reduction for impaired segment.

Table 8.24 TMDL for Frasure Creek RM 0.0 to 5.2

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					27154.7145	Existing Load
					<b>91.7906</b>	<b>Total TMDL</b>
					<b>9.1791</b>	<b>MOS</b>
					82.6115	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.70	% reduction
35252	KYG0079421	MCDOWELL ELEM SCHOOL	School	0.0232084	<b>0.1363</b>	<b>KPDES - WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.1908</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0324918	82.4207	remainder
					<b>0.8242</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>1.0150</b>	<b>Total WLA</b>
					<b>81.5965</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.7 Simpson Branch RM 0.0 to 1.8

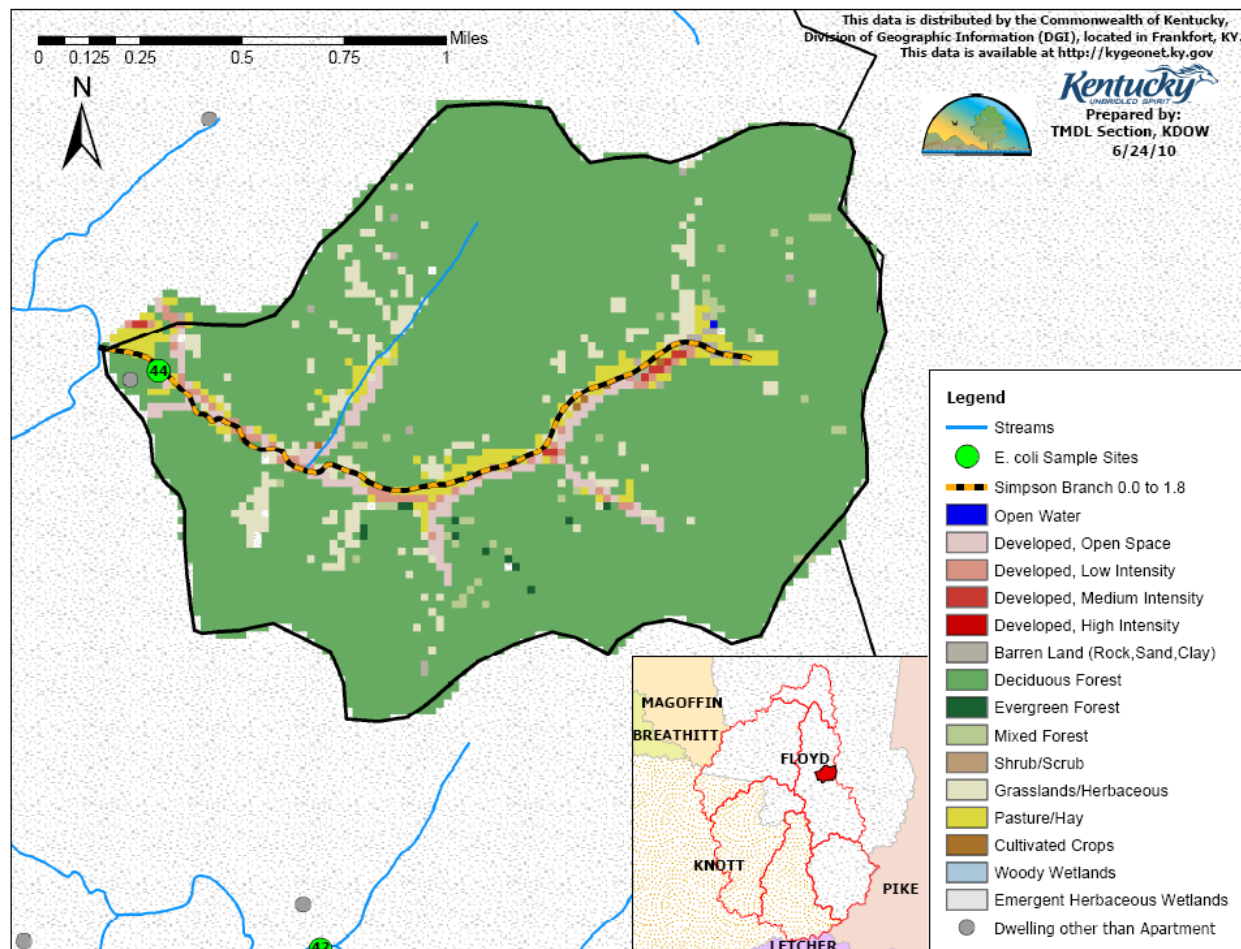


Figure 8.8 Simpson Branch RM 0.0 to 1.8

Simpson Branch is a second order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.8). Information about Simpson Branch, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.25. It has a catchment of 1,259 acres (2 square miles) with an 88% forested and 3.6% developed land cover (Table 8.26). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 44 is presented in Table 8.27 and TMDL allocations in Table 8.28.

Table 8.25 Simpson Branch RM 0.0 to 1.8 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Simpson Branch	Simpson Branch 0.0 to 1.8	503532_01	Floyd	1258.93	1.97	2nd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
44	44	0.2	37.47600	-82.74252	2.6	0	0.00077	0.00000	2.6008

Table 8.26 Simpson Branch RM 0.0 to 1.8 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.22	0.00	0.02	
Developed	44.84	0.07	3.56	0.5
Barren Land	5.77	0.01	0.46	
Forest/Shrubland	1110.64	1.74	88.22	
Grassland/Herbaceous	55.72	0.09	4.43	
Pasture/Hay	40.40	0.06	3.21	
Cultivated Crops	1.33	0.00	0.11	
Wetlands	0.00	0.00	0.00	
Totals	1258.93	1.97	100.00	

Table 8.27 Simpson Branch RM 0.0 to 1.8 Data (Site 44)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	30	N/A	N/A	N/A
05/30/08	40	0.2607	0.26	0.20
06/13/08	100	0.9723	2.38	1.89
07/31/08	54000	N/A	N/A	N/A
08/08/08	210	0.058	0.30	0.24
08/22/08	40	N/A	N/A	N/A
09/12/08	440	0.0624	0.67	0.53
09/20/08	160	0.077	0.30	0.24
10/24/08	1500	0.0465	1.71	1.36
Greatest Concentration	54000			



Table 8.28 TMDL for Simpson Branch RM 0.0 to 1.8

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					3436.0145	Existing Load
					<b>15.2712</b>	<b>Total TMDL</b>
					<b>1.5271</b>	<b>MOS</b>
					13.7441	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.60	% reduction
74022	KYG401406	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0007736	13.7395	remainder
					<b>0.0687</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.0732</b>	<b>Total WLA</b>
					<b>13.6708</b>	<b>LA</b>

Note:

<sup>(1)</sup> Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.8 Spurlock Creek RM 0.0 to 0.6

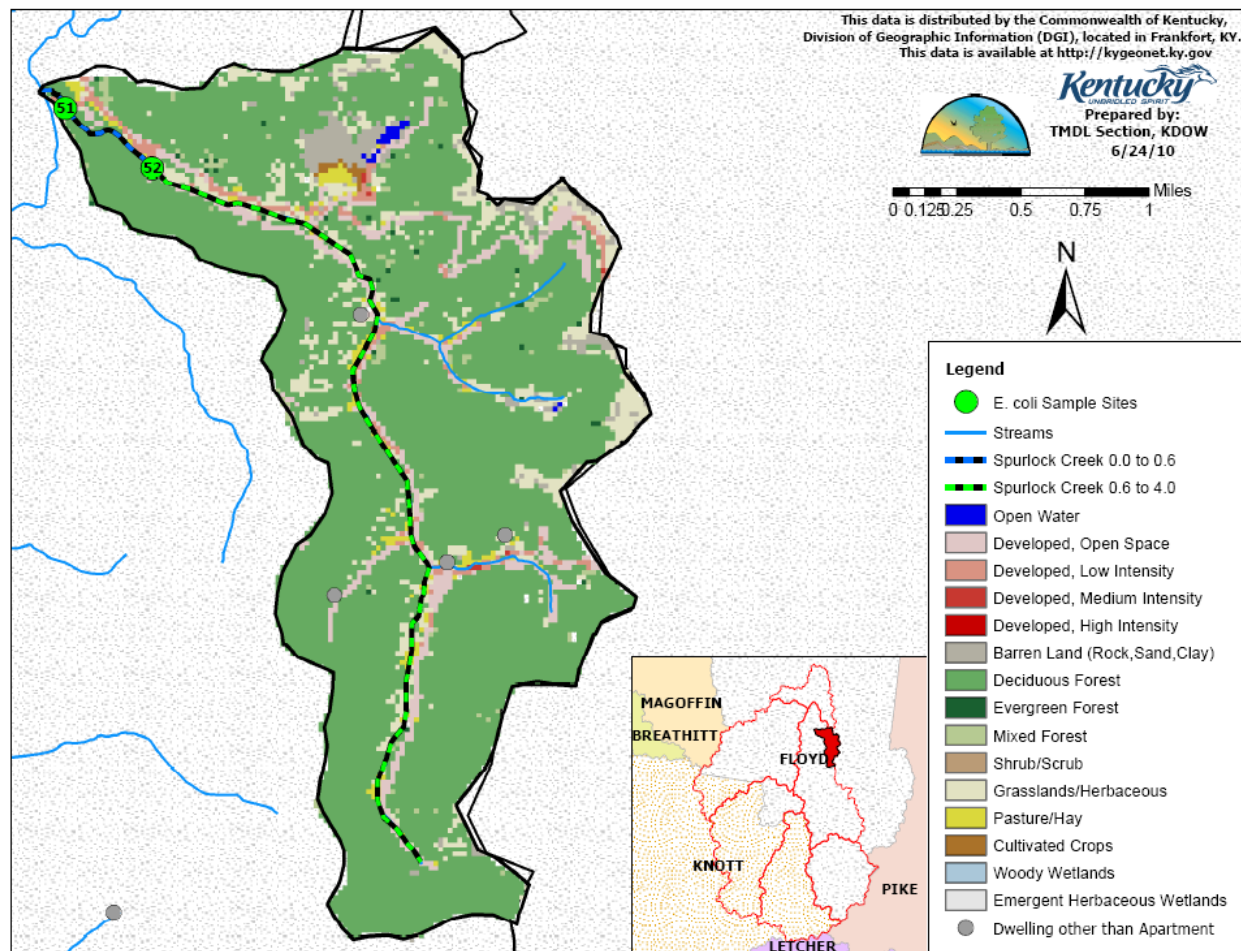


Figure 8.9 Spurlock Creek RM 0.0 to 0.6

Spurlock Creek is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.9). Information about Spurlock Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.29. It has a catchment of 2,468 acres (3.9 square miles) with a 79% forested and 7.6 % developed land cover (Table 8.30). This subwatershed is entirely un-sewered. Note that the upper portion of this subwatershed (above RM 0.6) has a fully supporting segment (see information for fully supporting segments in Appendix F). There are no stream water withdrawals in this subwatershed. Sampling data from site 51 is presented in Table 8.31 and TMDL allocations in Table 8.32.

Table 8.29 Spurlock Creek RM 0.0 to 0.6 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Spurlock Creek	Spurlock Creek 0.0 to 0.6	504191_01	Floyd	2468.29	3.86	3rd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
51	51	0.1	37.53080	-82.74220	5.1	0	0.00309	0.00000	5.1031

Table 8.30 Spurlock Creek RM 0.0 to 0.6 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	5.11	0.01	0.21	
Developed	188.64	0.29	7.64	1.0
Barren Land	67.32	0.11	2.73	
Forest/Shrubland	1945.26	3.04	78.81	
Grassland/Herbaceous	217.52	0.34	8.81	
Pasture/Hay	39.55	0.06	1.60	
Cultivated Crops	4.67	0.01	0.19	
Wetlands	0.22	0.00	0.01	
Totals	2468.29	3.86	100.00	

Table 8.31 Spurlock Creek RM 0.0 to 0.6 Data (Site 51)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	500	24.131	295.19	119.59
05/30/08	4100	15.727	1577.57	639.13
06/13/08	410	11.539	115.75	46.89
06/27/08	360	7.051	62.10	25.16
07/11/08	600	N/A	N/A	N/A
07/31/08	49000	46.941	56273.91	22798.74
7/31/08 (QA Sample)	46000	46.941	N/A	N/A
08/08/08	400	5.676	55.55	22.50
08/22/08	450	1.677	18.46	7.48
09/12/08	1400	20.251	693.64	281.02
09/20/08	1100	3.884	104.53	42.35
10/17/08	600	3.514	51.58	20.90
10/24/08	10	2.294	0.56	0.23
Greatest Concentration	49000			

Table 8.32 TMDL for Spurlock Creek RM 0.0 to 0.6

TMDL Table					<u>E. coli</u> (billion colonies/ day)	
					6117.7027	Existing Load
					<b>29.9643</b>	<b>Total TMDL</b>
					<b>2.9964</b>	<b>MOS</b>
					26.9678	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.60	% reduction
46144	KYG401601	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.00077361	<b>0.0045</b>	<b>KPDES WLA</b>
1161	KYG400692	CASE RESIDENCE	Dwelling Other than Apartment	0.00077361	<b>0.0045</b>	<b>KPDES WLA</b>
1315	KYG400677	SHREWBERRY RESIDENCE	Dwelling Other than Apartment	0.00077361	<b>0.0045</b>	<b>KPDES WLA</b>
1162	KYG400678	CASTLE RESIDENCE	Dwelling Other than Apartment	0.00077361	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.0180</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.00309446	26.9497	remainder
					<b>0.2695</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.2875</b>	<b>Total WLA</b>
					<b>26.6802</b>	<b>LA</b>

Note:

<sup>(1)</sup> Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.9 Sizemore Branch RM 0.0 to 2.0

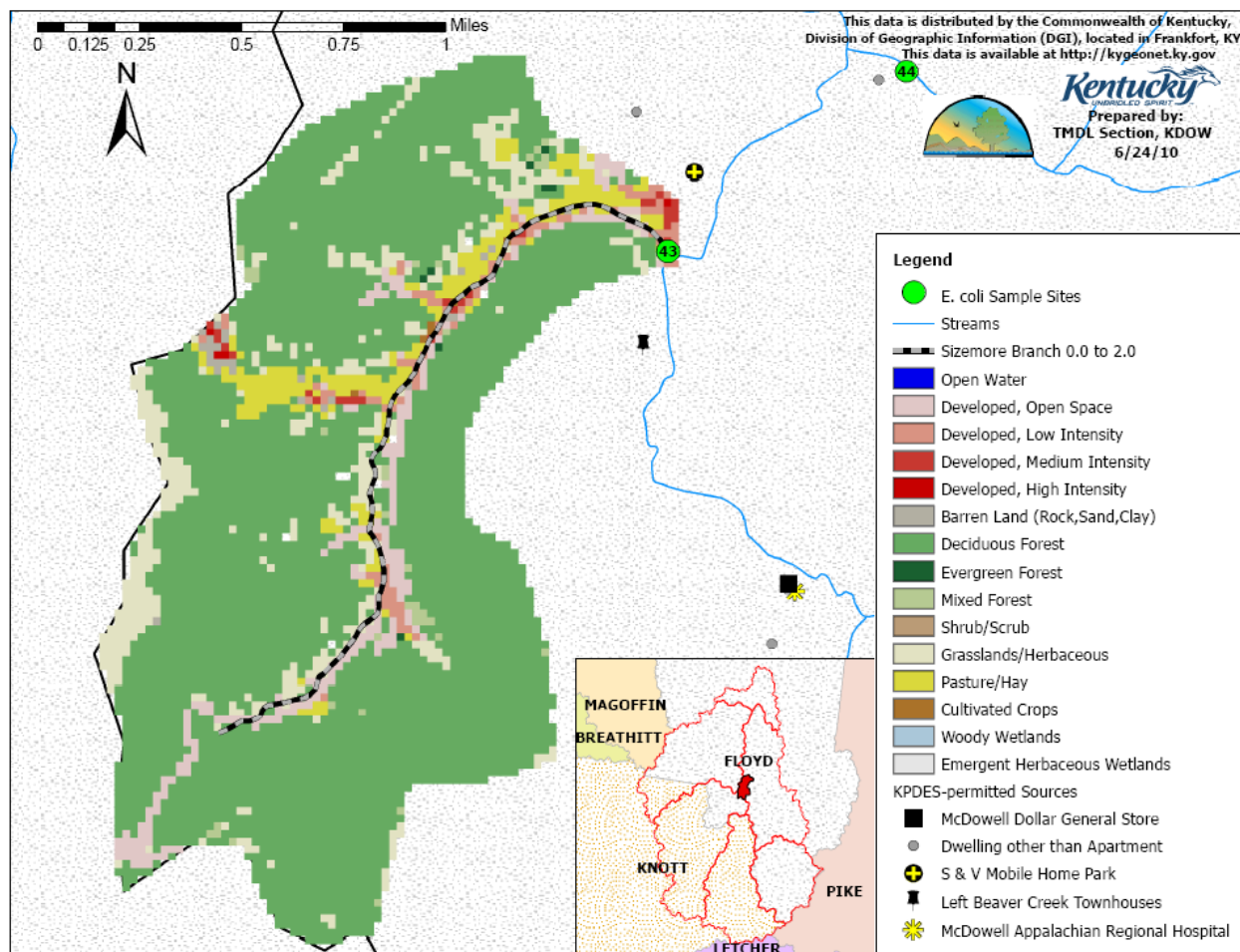


Figure 8.10 Sizemore Branch RM 0.0 to 2.0

Sizemore Branch is a first order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.10). Information about Sizemore Branch, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.33. It has a catchment of 990 acres (1.5 square miles) with an 80% forested and 7% developed land cover (Table 8.34). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 43 is presented in Table 8.35 and TMDL allocations in Table 8.36.

Table 8.33 Sizemore Branch RM 0.0 to 2.0 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Sizemore Branch	Sizemore Branch 0.0 to 2.0	503590_01	Floyd	989.59	1.55	1st order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
43	43	0.05	37.47028	-82.75408	2.1	0	0.00309	0.00000	2.1031

Table 8.34 Sizemore Branch RM 0.0 to 2.0 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	68.95	0.11	6.97	1.0
Barren Land	6.01	0.01	0.61	
Forest/Shrubland	789.18	1.23	79.75	
Grassland/Herbaceous	81.19	0.13	8.20	
Pasture/Hay	42.93	0.07	4.34	
Cultivated Crops	1.33	0.00	0.13	
Wetlands	0.00	0.00	0.00	
Totals	989.59	1.55	100.00	

Table 8.35 Sizemore Branch RM 0.0 to 2.0 Data (site 43)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	800	N/A	N/A	N/A
05/30/08	270	0.1229	0.81	0.82
5/30/08 (QA Sample)	220	N/A	N/A	N/A
06/13/08	300	0.1023	0.75	0.76
06/27/08	760	0.0669	1.24	1.26
07/31/08	9000	N/A	N/A	N/A
08/08/08	350	0.152	1.30	1.32
08/22/08	700	0.084	1.44	1.45
09/12/08	1700	0.0865	3.60	3.64
09/20/08	39000	0.154	146.94	148.49
9/20/08 (QA Sample)	27000	N/A	N/A	N/A
10/17/08	1200	0.2832	8.31	8.40
10/24/08	72000	N/A	N/A	N/A
Greatest Concentration	72000			



Table 8.36 TMDL for Sizemore Branch RM 0.0 to 2.0

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					3704.6737	Existing Load
					<b>12.3489</b>	<b>Total TMDL</b>
					<b>1.2349</b>	<b>MOS</b>
					11.1140	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.70	% reduction
1369	KYG400724	YOUMANS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1218	KYG400567	HICKS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG400854	COLLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG401516	COLLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.0180</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.003094	11.0959	remainder
					<b>0.1110</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.1290</b>	<b>Total WLA</b>
					<b>10.9849</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.10 Spewing Camp Branch RM 0.0 to 3.1

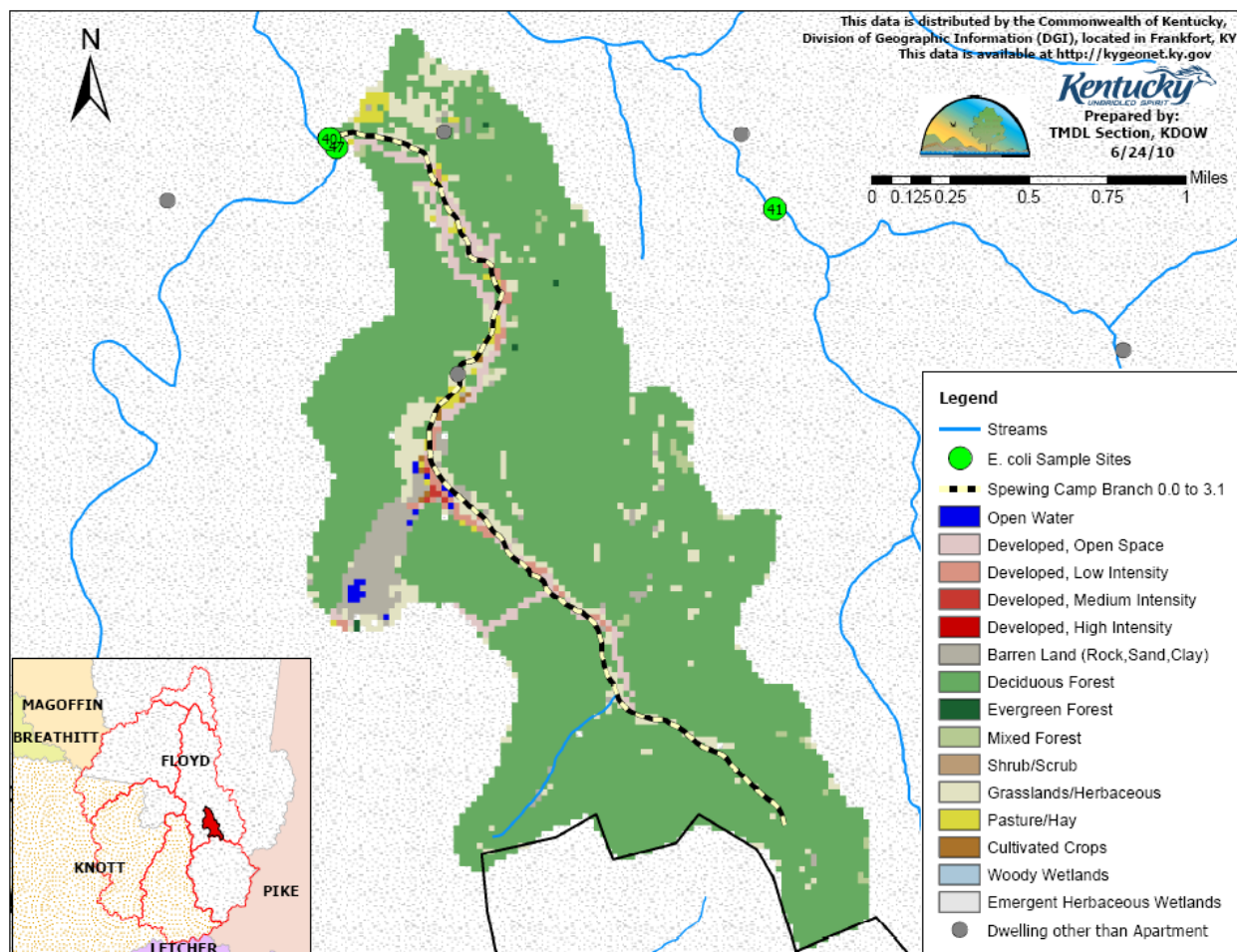


Figure 8.11 Spewing Camp Branch RM 0.0 to 3.1

Spewing Camp Branch is a second order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure 8.11). Information about Spewing Camp Branch, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.37. It has a catchment of 1,572 acres (2.5 square miles) with an 85% forested and 3.7% developed land cover (Table 8.38). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 40 is presented in Table 8.39 and TMDL allocations in Table 8.40.

Table 8.37 Spewing Camp Branch RM 0.0 to 3.1 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Spewing Camp	Spewing Camp Branch 0.0 to 3.1	504061_01	Floyd	1572.02	2.46	2nd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
40	40	0.05	37.43039	-82.73443	3.4	0	0.00155	0.00000	3.4015

Table 8.38 Spewing Camp Branch RM 0.0 to 3.1 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	4.00	0.01	0.25	
Developed	57.39	0.09	3.65	0.5
Barren Land	45.82	0.07	2.91	
Forest/Shrubland	1340.68	2.09	85.28	
Grassland/Herbaceous	106.77	0.17	6.79	
Pasture/Hay	15.13	0.02	0.96	
Cultivated Crops	2.00	0.00	0.13	
Wetlands	0.22	0.00	0.01	
Totals	1572.02	2.46	100.00	

Table 8.39 Spewing Camp Branch RM 0.0 to 3.1 Data (Site 40)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	1300	N/A	N/A	N/A
05/30/08	<10	0.122	0.03	0.02
06/13/08	200	0.0464	0.23	0.14
6/13/08 (QA Sample)	300	N/A	N/A	N/A
06/27/08	100	0.0476	0.12	0.07
07/11/08	310	0.098	0.74	0.47
07/31/08	52000	25.9819	33054.68	21026.88
08/08/08	40	5.278	5.17	3.29
08/22/08	90	0.065	0.14	0.09
8/22/08 (QA Sample)	160	N/A	N/A	N/A
09/12/08	190	0.522	2.43	1.54
09/20/08	<10	0.065	0.02	0.01
10/17/08	190	0.0408	0.19	0.12
10/17/08 (QA Sample)	190	N/A	N/A	N/A
10/24/08	10	0.038	0.01	0.01
Greatest Concentration	52000			

Table 8.40 TMDL for Spewing Camp Branch RM 0.0 to 3.1

TMDL Table					<u>E. coli</u> (billion colonies/ day)	
					4327.5145	Existing Load
					<b>19.9731</b>	<b>Total TMDL</b>
					<b>1.9973</b>	<b>MOS</b>
					17.9758	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.58	% reduction
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.00077361	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.00077361	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.0090</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.00154723	17.9667	remainder
					<b>0.0898</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.0988</b>	<b>Total WLA</b>
					<b>17.8769</b>	<b>LA</b>

Note:

<sup>(1)</sup> Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.11 Left Fork Beaver Creek RM 11.4 to 13.55

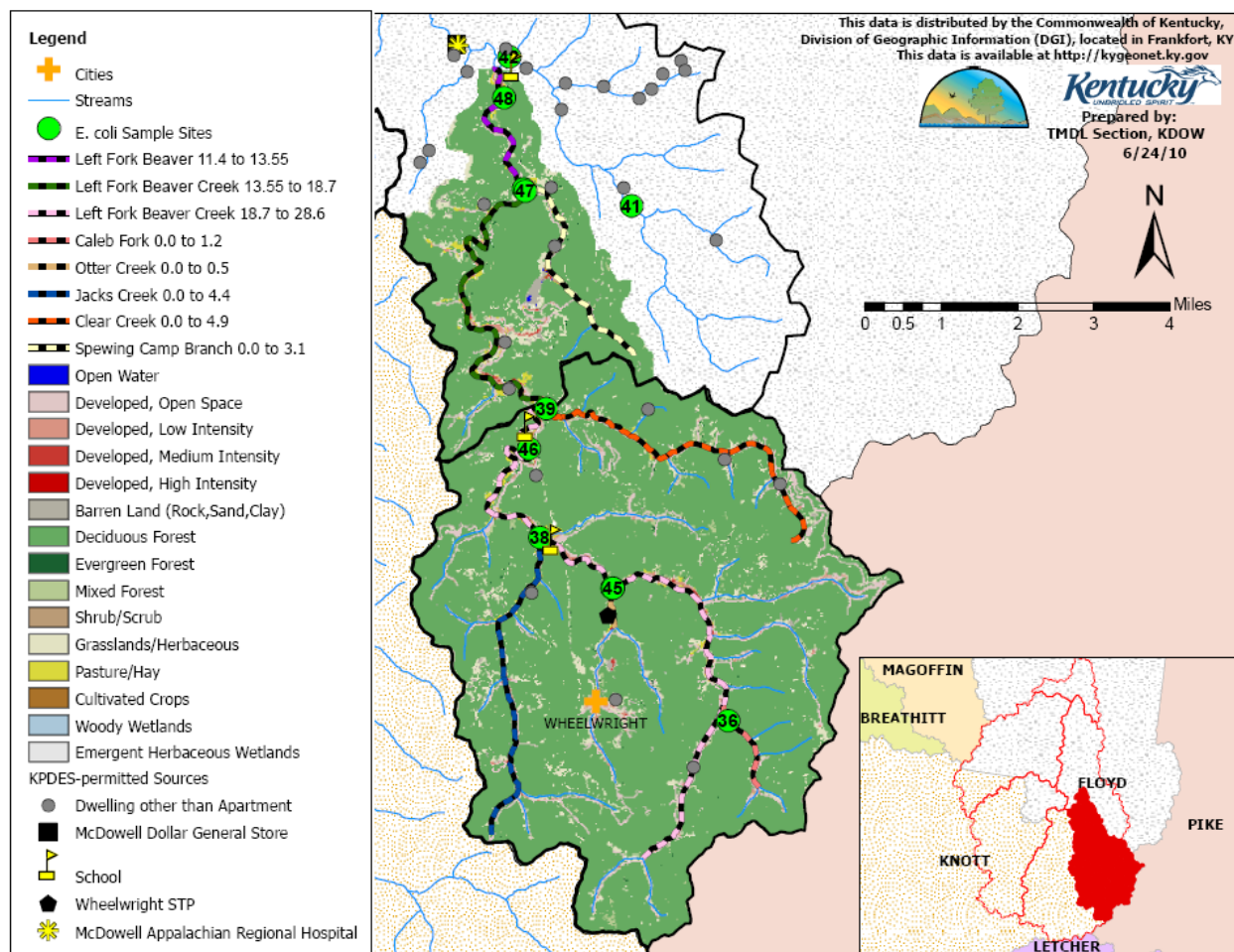


Figure 8.12 Left Fork Beaver Creek RM 11.4 to 13.55

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45 and site 40 is under site 47.

Left Fork Beaver Creek at RM 13.55 is a fourth order stream located in Floyd County (Figure 8.12). Information about Left Fork Beaver Creek at RM 13.55, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.41. Its watershed encompasses all of the Upper Left Fork Beaver Creek subwatershed and upper portions of the Lower Left Fork Beaver Creek subwatershed. It has a catchment of 25,003 acres (39.1 square miles) with an 85% forested and 6.8% developed land cover (Table 8.42). Portions of this subwatershed around the city of Wheelwright are sewered (see Figure 5.16). There is one stream water withdrawal in this subwatershed at RM 15.36 of the Left Fork Beaver Creek (see Table 8.43). Sampling data from site 48 is presented in Table 8.44 and TMDL allocations in Table 8.45.

Table 8.41 Left Fork Beaver Creek RM 11.4 to 13.55 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Left Fork Beaver Creek	Left Fork Beaver Creek 11.4 to 13.55	496194_02	Floyd	25003.22	39.07	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
48	48	11.8	37.44780	-82.73840	53.4	11.4	0.39114	0.09283	53.6983

Table 8.42 Left Fork Beaver Creek RM 11.4 to 13.55 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	4.01	0.01	0.02	
Developed	1698.37	2.65	6.79	1.0
Barren Land	254.32	0.40	1.02	
Forest/Shrubland	21252.92	33.21	85.00	
Grassland/ Herbaceous	1446.28	2.26	5.78	
Pasture/ Hay	316.85	0.50	1.27	
Cultivated Crops	28.70	0.04	0.11	
Wetlands	1.78	0.00	0.01	
Totals	25003.22	39.07	100.00	

Table 8.43 Left Fork Beaver Creek RM 11.4 to 13.55 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
		subtraction from MAF (sum of cfs)	0.09283372		



Table 8.44 Left Fork Beaver Creek RM 11.4 to 13.55 Data (Site 48)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	130	N/A	N/A	N/A
05/30/08	100	9.071	22.19	0.89
06/13/08	80	7.686	15.04	0.60
06/27/08	250	4.4441	27.18	1.09
07/31/08	69000	N/A	N/A	N/A
08/08/08	250	6.695	40.95	1.64
08/22/08	100	1.373	3.36	0.13
09/12/08	2100	114.166	5865.63	234.60
09/20/08	110	2.553	6.87	0.27
10/17/08	50	2.8575	3.50	0.14
10/24/08	190	1.4364	6.68	0.27
Greatest Concentration	69000			

Table 8.45 TMDL for Left Fork Beaver Creek RM 11.4 to 13.55

TMDL Table					<u>E. coli</u> (billion colonies/ day)	
					90650.1145	Existing Load
					<b>315.3047</b>	<b>Total TMDL</b>
					<b>31.5305</b>	<b>MOS</b>
					283.7743	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.69	% reduction
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1274	KYG400714	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4333	KYG401140	DYE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.010521	<b>0.0618</b>	<b>KPDES WLA</b>
40534	KY0028789	WHEEL-WRIGHT STP	Sewerage System	0.348127	<b>2.0441</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74062	KYG401442	MULLINS II RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.023208	<b>0.1363</b>	<b>KPDES WLA</b>
					<b>2.2962</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.391139	281.4776	remainder
					<b>2.8148</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>5.1110</b>	<b>Total WLA</b>
					<b>278.6628</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.12 Left Fork Beaver Creek RM 0.0 to 11.4

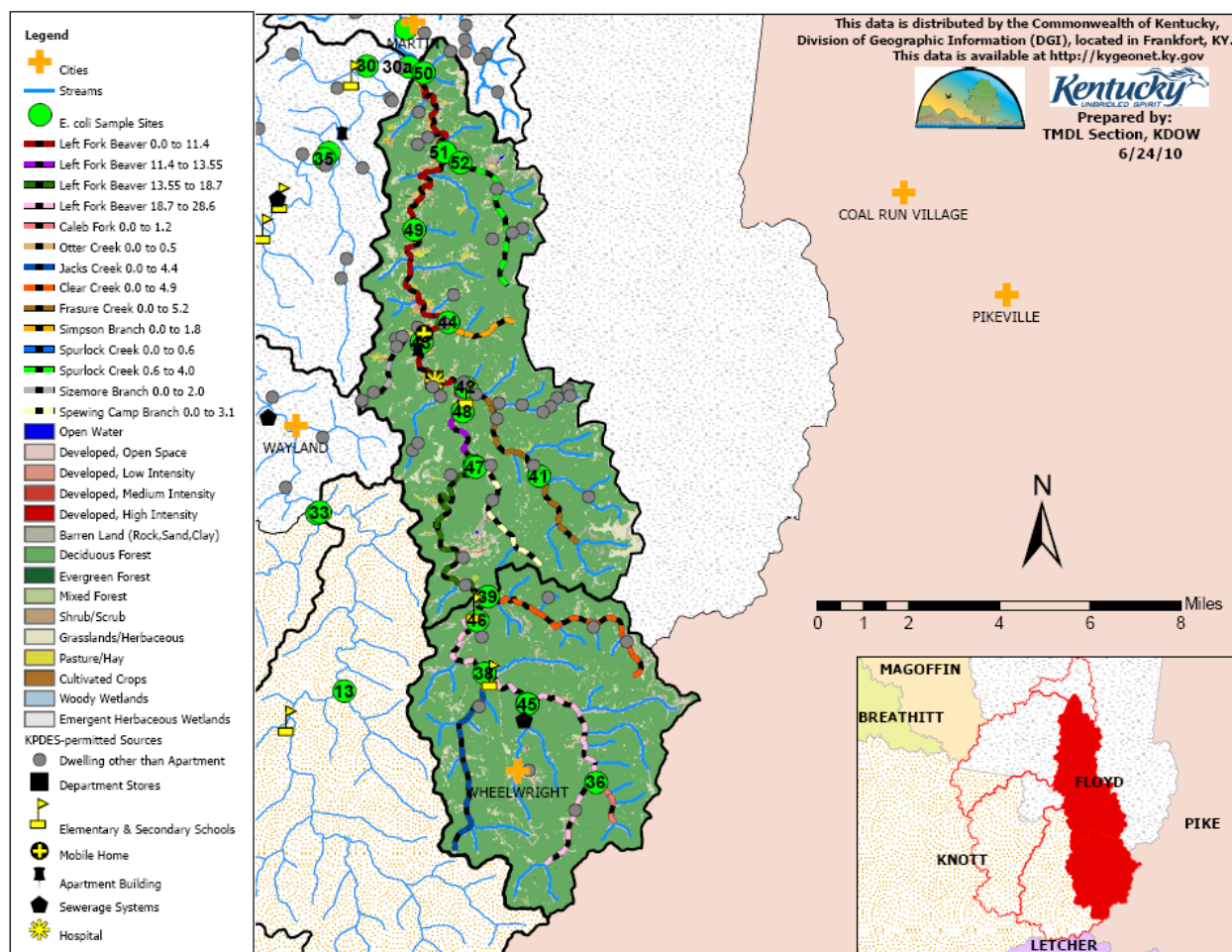


Figure 8.13 Left Fork Beaver Creek RM 0.0 to 11.4

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Left Fork Beaver Creek at RM 0.0 is a fourth order stream located in Floyd County (Figure 8.13). Its subwatershed encompasses all of the Upper and Lower Left Fork Beaver Creek subwatersheds. Information about Left Fork Beaver 0.0 to 11.4, including sample site locations, waterbody identification number (WBID), and MAF is shown in Table 8.46. It has a catchment of 46,862 acres (73 square miles) with an 82% forested and 6.8% developed land cover (Table 8.47). Portions of this subwatershed are seweraged around the city of Wheelwright (see Figure 5.16). There are two stream water withdrawals in this subwatershed at RMs 15.36 and 2.4 of Left Fork Beaver Creek (see Table 8.48). This segment had two sample sites and data from sites 49 and 50 is presented in Table 8.49. Site 49 had the greatest concentration (53,000) so this concentration was used to set the existing loads and percent reduction for the impaired segment. However, to extrapolate to the end of the impaired segment, the Adjusted MAF from site 50 (97.7535 cfs) was used as the flow to set the TMDL for this impaired segment. The TMDL calculations for site 49 and 50 are shown in Appendix E while the TMDL for Left Fork Beaver Creek RM 0.0 to 11.4 is shown in Table 8.50.

Table 8.46 Left Fork Beaver Creek RM 0.0 to 11.4 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Left Fork Beaver Creek	Left Fork Beaver Creek 0.0 to 11.4	496194_01	Floyd	46861.59	73.221	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
49	49	5.6	37.50640	-82.75550	84.5	5.6	0.50857	0.09283	84.9157
50	50	0.3	37.55640	-82.74970	98	0	0.51476	0.76124	97.7535

Table 8.47 Left Fork Beaver Creek RM 0.0 to 11.4 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	12.46	0.02	0.03	
Developed	3207.43	5.01	6.84	1.0
Barren Land	483.82	0.76	1.03	
Forest/Shrubland	38659.82	60.41	82.50	
Grassland/Herbaceous	3224.34	5.04	6.88	
Pasture/Hay	1178.07	1.84	2.51	
Cultivated Crops	90.31	0.14	0.19	
Wetlands	5.34	0.01	0.01	
Totals	46861.59	73.22	100.00	

Table 8.48 Left Fork Beaver Creek RM 0.0 to 11.4 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
78571	RM 2.4 of Left Fork Beaver Creek	Black Diamond Mining	0.6684028	37.53192	-82.74364
		subtraction from MAF (sum of cfs)	0.76123652		

Table 8.49 Left Fork Beaver Creek RM 0.0 to 11.4 Data (Sites 49 and 50)

Site 49				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	170	N/A	N/A	N/A
05/30/08	30	11.975	8.79	0.22
5/30/08 (QA Sample)	20	N/A	N/A	N/A
06/13/08	60	7.4685	10.96	0.27
06/27/08	110	7.915	21.30	0.53
07/31/08	53000	37.108	48117.39	1202.13
08/08/08	70	8.333	14.27	0.36
08/22/08	<10	1.803	0.44	0.01
09/12/08	380	N/A	N/A	N/A
9/12/08 (QA Sample)	240	N/A	N/A	N/A
09/20/08	130	1.8648	5.93	0.15
10/17/08	100	3.999	9.78	0.24
10/24/08	170	3.356	13.96	0.35
Greatest Concentration	53000			
Site 50				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	390	N/A	N/A	N/A
05/30/08	600	N/A	N/A	N/A
06/13/08	220	N/A	N/A	N/A
6/13/08 (QA Sample)	190	N/A	N/A	N/A
06/27/08	70	N/A	N/A	N/A
07/11/08	390	12.956	123.62	2.64
07/31/08	27000	N/A	N/A	N/A
08/08/08	220	5.708	30.72	0.66
08/22/08	240	0.0144	0.08	0.00
09/12/08	16000	22.148	8669.88	185.01
09/20/08	170	3.596	14.96	0.32
10/17/08	180	3.155	13.89	0.30
10/24/08	10	3.413	0.84	0.02
Greatest Concentration	27000			

Table 8.50 TMDL for Left Fork Beaver Creek RM 0.0 to 11.4

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					126755.5507	Existing Load
					<b>573.9874</b>	<b>Total TMDL</b>
					<b>57.3987</b>	<b>MOS</b>
					516.5887	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.59	% reduction
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.3481265	<b>2.0441</b>	<b>KPDES WLA</b>
35252	KY0079421	MCDOWELL ELEM SCHOOL	School	0.0232084	<b>0.1363</b>	<b>KPDES WLA</b>
1134	KY0085791	MCDOWELL APPALACHIAN REG HOSP	Hospital	0.0309446	<b>0.1817</b>	<b>KPDES WLA</b>
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.0105212	<b>0.0618</b>	<b>KPDES WLA</b>
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.0232084	<b>0.1363</b>	<b>KPDES WLA</b>
1255	KY0096342	LEFT BEAVER CREEK TOWNHOUSES	Apartment Building	0.0278501	<b>0.1635</b>	<b>KPDES WLA</b>
1263	KY0103136	MCDOWELL DOLLAR GENERAL STORE	Department Store	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1305	KY0103233	S & V MHP	Mobile Home Site	0.0153176	<b>0.0899</b>	<b>KPDES WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1143	KYG400479	BLACKBURN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1218	KYG400567	HICKS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1367	KYG400579	WRIGHT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4250	KYG400659	CURRENT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>



AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1315	KYG400677	SHREWBERRY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1162	KYG400678	CASTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1161	KYG400692	CASE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1274	KYG400714	MULLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1369	KYG400724	YOUMANS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG400854	COLLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4333	KYG401140	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4332	KYG401142	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15635	KYG401271	LAWSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74022	KYG401406	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
74025	KYG401409	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74062	KYG401442	MULLINS II RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG401516	COLLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45073	KYG401582	DINGUS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45396	KYG401587	GEARHEART RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45070	KYG401590	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
46144	KYG401601	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48864	KYG401645	DUFF RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
75141	KYG401851	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>3.0226</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.5147631	513.5661	remainder
					<b>5.1357</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>8.1582</b>	<b>Total WLA</b>
					<b>508.4304</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.13 Right Fork Beaver Creek RM 30.3 to 33.4

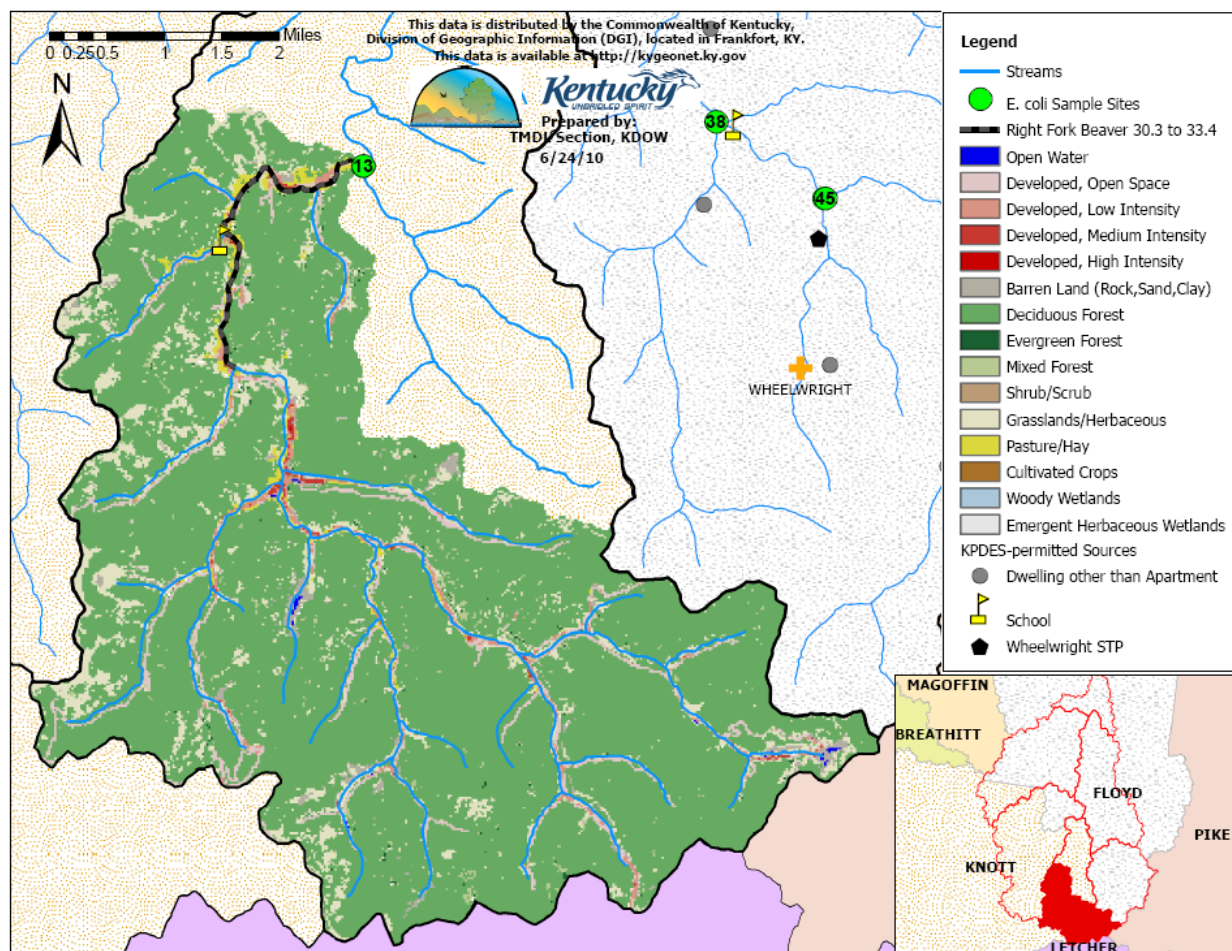


Figure 8.14 Right Fork Beaver Creek RM 30.3 to 33.4

The Right Fork Beaver Creek at RM 30.3 is a fourth order stream located in the Upper Right Fork Beaver Creek subwatershed in Knott County (Figure 8.14). Information about the Right Fork Beaver Creek RM 30.3 to 33.4 subwatershed, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.51. It has a catchment of 16,909 acres (26.4 square miles) with an 83% forested and 5.3% developed land cover (Table 8.52). This subwatershed is entirely un-sewered. There is one stream water withdrawal in this subwatershed at RM 40.6 of Right Fork Beaver Creek (Table 8.53). Sampling data from site 13 is presented in Table 8.54 and TMDL allocations in Table 8.55.

Table 8.51 Right Fork Beaver Creek RM 30.3 to 33.4 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Right Fork Beaver Creek	Right Fork Beaver Creek 30.3 to 33.4	501863_04	Knott	16908.97	26.42	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
13	13	30.3	37.35989	-82.78935	43.3	30.3	0.01083	0.41002	42.9008

Table 8.52 Right Fork Beaver Creek RM 30.3 to 33.4 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	11.12	0.02	0.07	
Developed	893.21	1.40	5.28	1.0
Barren Land	265.50	0.41	1.57	
Forest/Shrubland	13956.50	21.81	82.54	
Grassland/Herbaceous	1570.73	2.45	9.29	
Pasture/Hay	202.35	0.32	1.20	
Cultivated Crops	9.12	0.01	0.05	
Wetlands	0.44	0.00	0.00	
Totals	16908.97	26.42	100.00	

Table 8.53 Right Fork Beaver Creek RM 30.3 to 33.4 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
		subtraction from MAF (sum of cfs)	0.4100156		

Table 8.54 Right Fork Beaver Creek RM 30.3 to 33.4 Data (Site 13)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/15/07	260	18.872	120.05	7.10
05/30/07	190	1.976	9.19	0.54
06/13/07	320	4.861	38.06	2.25
06/27/07	560	55.059	754.35	44.61
07/10/07	370	1.537	13.91	0.82
7/10/07 (QA Sample)	330	1.537	N/A	N/A
07/26/07	1900	14.412	669.94	39.62
08/17/07	320	1.384	10.84	0.64
08/31/07	210	N/A	N/A	N/A
09/13/07	110	1.829	4.92	0.29
09/28/07	110	0.59	1.59	0.09
10/12/07	<10	0.612	0.15	0.01
10/12/07 (QA Sample)	<10	0.612	0.15	0.01
11/16/07 (outside PCR season)	430	1.4244	14.99	0.89
Greatest Concentration	1900			



Table 8.55 TMDL for Right Fork Beaver Creek RM 30.3 to 33.4

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					1994.2419	Existing Load
					<b>251.9042</b>	<b>Total TMDL</b>
					<b>25.1904</b>	<b>MOS</b>
					226.7138	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	88.63	% reduction
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.0108306	<b>0.0636</b>	<b>KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0108306	226.6502	remainder
					<b>2.2665</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>2.3301</b>	<b>Total WLA</b>
					<b>224.3837</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.14 Caney Fork RM 0.0 to 7.5

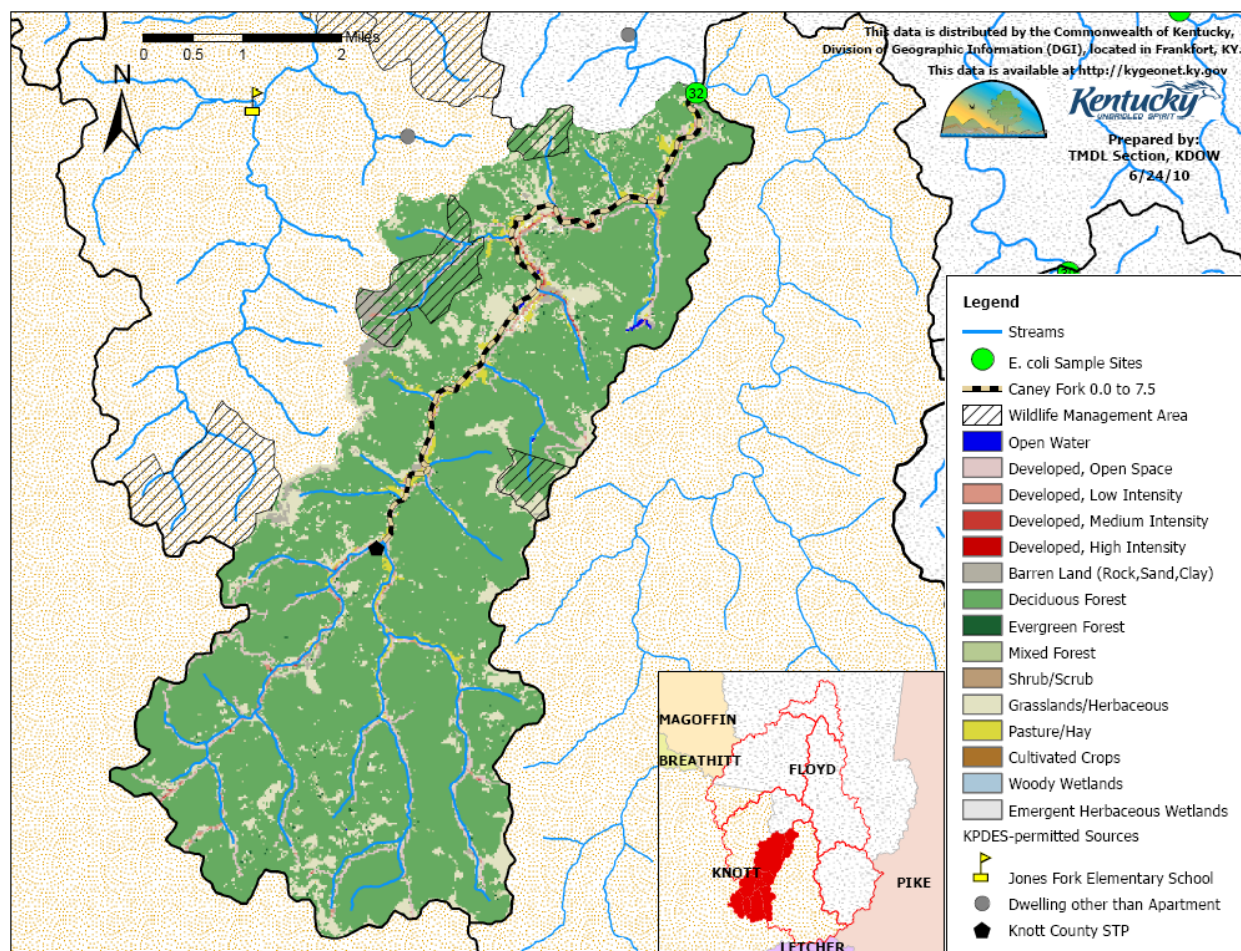


Figure 8.15 Caney Fork RM 0.0 to 7.5

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 33 is under site 32.

Caney Fork is a third order stream located in the Middle Right Fork Beaver Creek subwatershed in Knott County (Figure 8.15). Information about Caney Fork, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.56. It has a catchment of 15,657.3 acres (24.5 square miles) with an 80% forested and 4.7% developed land cover (Table 8.57). Portions of this subwatershed in the headwaters around Alice Lloyd College are sewered (Figure 8.16). There are several wildlife management areas in this subwatershed. There is one stream water withdrawal in this subwatershed at RM 4.2 of Caney Creek (Table 8.58). Sampling data from site 32 is presented in Table 8.59 and TMDL allocations in Table 8.60.

Table 8.56 Caney Fork RM 0.0 to 7.5 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order				
Caney Fork	Caney Fork 0.0 to 7.5	48862_01	Knott	15657.29	24.47	3rd order				
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)	
32	32	0.05	37.41672	-82.79799	33.4	0	0.15472	1.00570	32.5490	

Table 8.57 Caney Fork RM 0.0 to 7.5 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	8.89	0.01	0.06	
Developed	735.26	1.15	4.70	0.5
Barren Land	248.35	0.39	1.59	
Forest/Scrubland	12464.78	19.48	79.61	
Grassland/Herbaceous	1933.87	3.02	12.35	
Pasture/Hay	258.80	0.40	1.65	
Cultivated Crops	6.45	0.01	0.04	
Wetlands	0.89	0.00	0.01	
Totals	15657.29	24.46	100.00	

Table 8.58 Caney Fork RM 0.0 to 7.5 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF (sum of cfs)	1.005699		



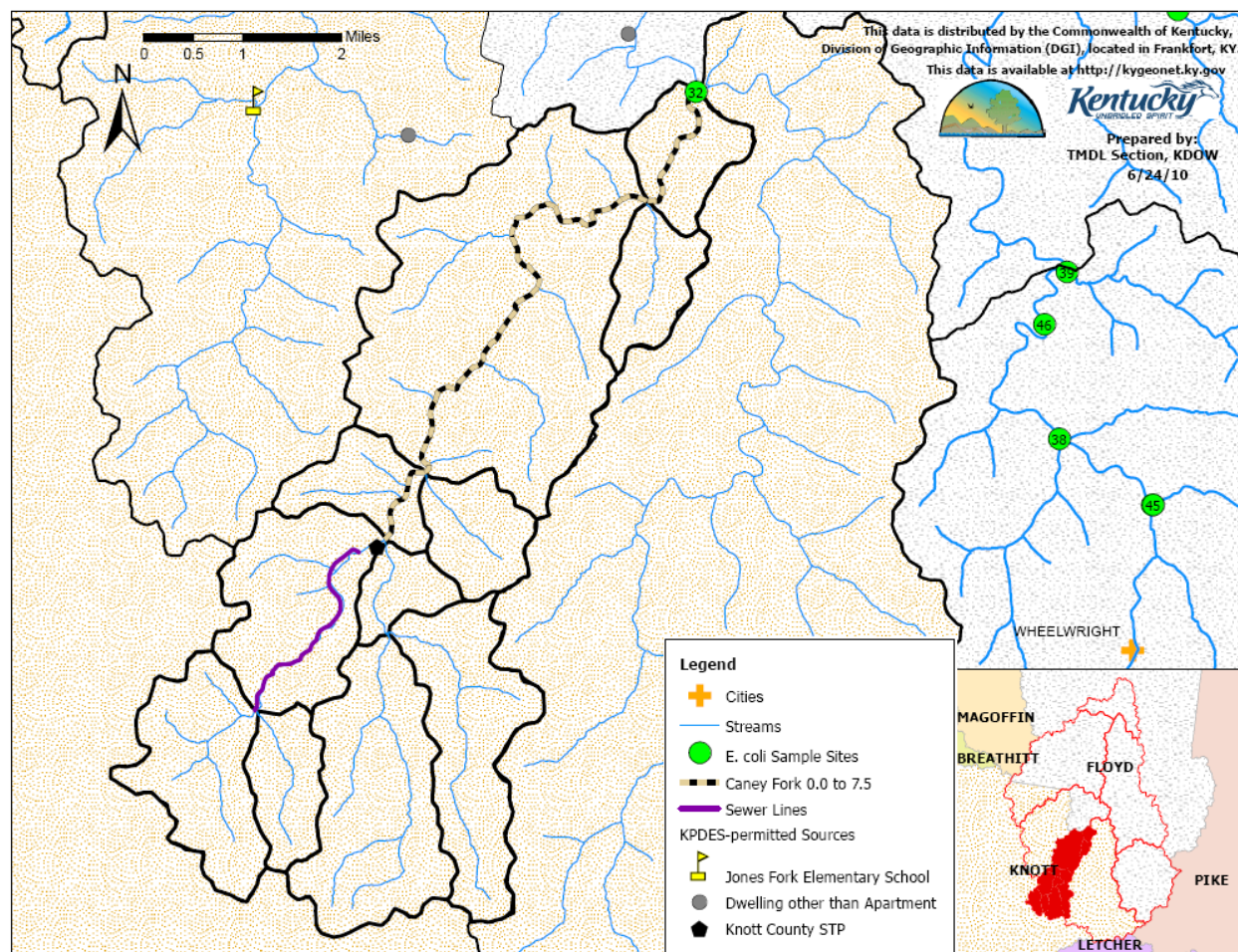


Figure 8.16 Caney Fork Sewer Lines

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 33 is under site 32.

Table 8.59 Caney Fork RM 0.0 to 7.5 Data (Site 32)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/15/07	100	151.9515	371.76	23.74
05/30/07	300	4.797	35.21	2.25
06/13/07	110	2.131	5.74	0.37
06/27/07	430	5.698	59.94	3.83
07/10/07	210	1.233	6.33	0.40
07/26/07	690	20.379	344.03	21.97
08/17/07	400	1.705	16.69	1.07
08/31/07	260	N/A	N/A	N/A
09/14/07	170	0.105	0.44	0.03
09/28/07	30	0.084	0.06	0.00
10/12/07	<10	0.275	0.07	0.00
11/16/07 (outside PCR season)	710	1.2337	21.43	1.37
Greatest Concentration	690			

Table 8.60 TMDL for Caney Fork RM 0.0 to 7.5

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					549.4722	Existing Load
					<b>191.1208</b>	<b>Total TMDL</b>
					<b>19.1121</b>	<b>MOS</b>
					172.0087	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	68.70	% reduction
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.1547229	171.1002	remainder
					<b>0.8555</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>1.764</b>	<b>Total WLA</b>
					<b>170.2447</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.15 Jones Fork RM 0.0 to 9.9

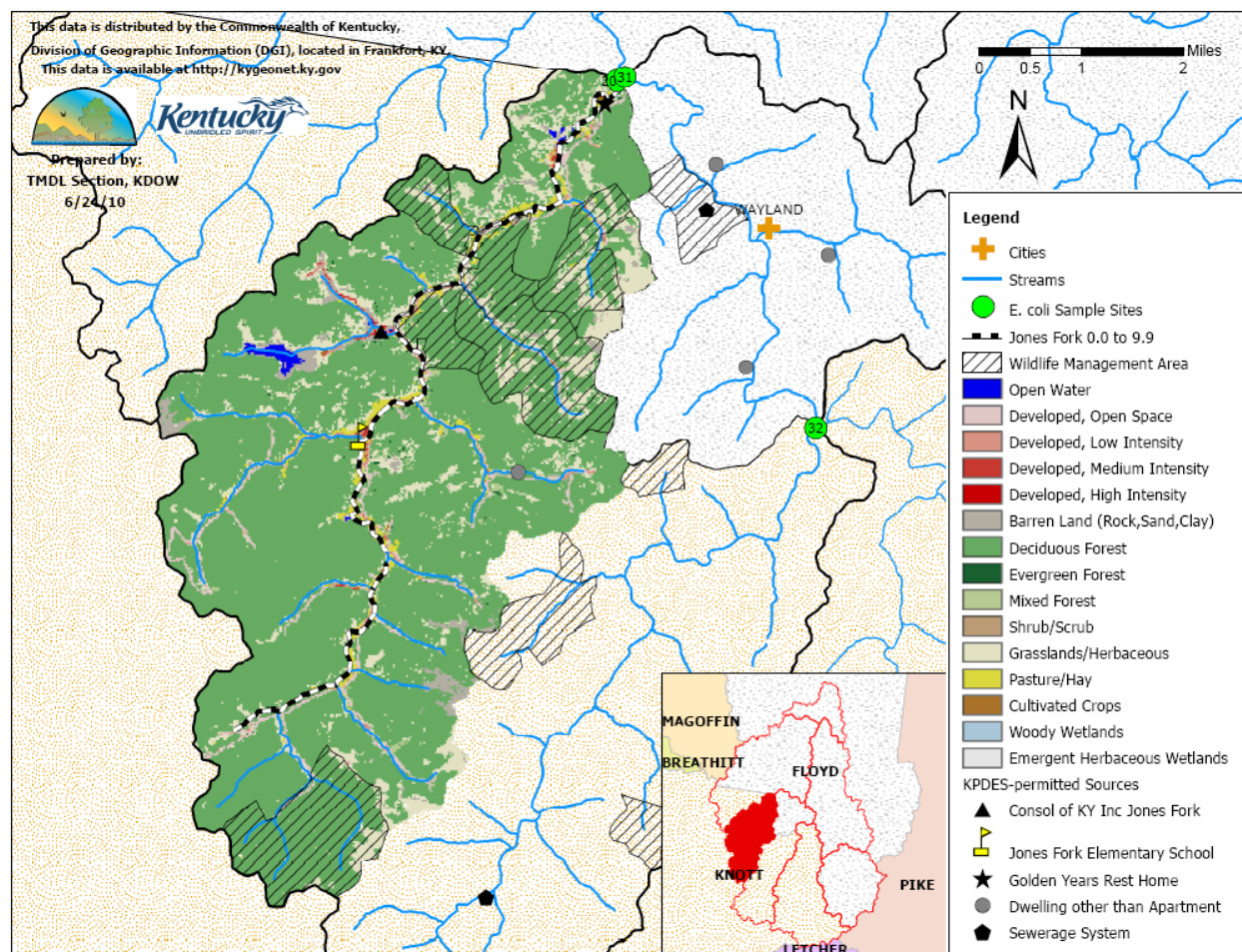


Figure 8.17 Jones Fork RM 0.0 to 9.9

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 20 is under site 31 and site 33 is under site 32.

Jones Fork is a third order stream located in the Middle Right Fork Beaver Creek subwatershed in Knott County (Figure 8.17). Information about Jones Fork, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.61. It has a catchment of 14,630.2 acres (2.9 square miles) with an 80% forested and 3.8% developed land cover (Table 8.62). This subwatershed is entirely un-sewered. There are several wildlife management areas in this subwatershed. There are no stream water withdrawals in this subwatershed. Sampling data from site 20 is presented in Table 8.63 and TMDL allocations in Table 8.64.



Table 8.61 Jones Fork RM 0.0 to 9.9 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Jones Fork	Jones Fork 0.0 to 9.9	495499_01	Knott	14630.21	22.86	3rd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
20	20	0.05	37.46684	-82.83148	30.8	0	0.03017	0	30.8302

Table 8.62 Jones Fork RM 0.0 to 9.9 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	52.70	0.08	0.36	
Developed	556.14	0.87	3.80	0.5
Barren Land	344.00	0.54	2.35	
Forest/Shrubland	11649.82	18.20	79.63	
Grassland/Herbaceous	1716.23	2.68	11.73	
Pasture/Hay	293.52	0.46	2.01	
Cultivated Crops	16.68	0.03	0.11	
Wetlands	1.11	0.00	0.01	
Totals	14630.21	22.86	100.00	

Table 8.63 Jones Fork RM 0.0 to 9.9 Data (Site 20)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/15/07	140	1.219	4.18	0.29
05/30/07	320	3.587	28.08	1.92
06/13/07	280	2.101	14.39	0.98
06/27/07	3100	2.128	161.40	11.03
07/10/07	370	1.062	9.61	0.66
07/26/07	4300	4.294	451.74	30.88
08/17/07	20	0.455	0.22	0.02
08/31/07	290	0.217	1.54	0.11
09/14/07	180	0.304	1.34	0.09
9/14/07 (QA/Sample)	70	N/A	N/A	N/A
09/28/07	170	0.107	0.45	0.03
10/12/07	<10	0.035	0.01	0.00
11/16/07 (outside PCR season)	120	4.091	12.01	0.82
Greatest Concentration	4300			

Table 8.64 TMDL for Jones Fork RM 0.0 to 9.9

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					3243.4191	Existing Load
					<b>181.0280</b>	<b>Total TMDL</b>
					<b>18.1028</b>	<b>MOS</b>
					162.9252	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	94.98	% reduction
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.0092834	<b>0.0545</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig, Surface	0.0046417	<b>0.0273</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care Facility	0.0154723	<b>0.0908</b>	<b>KPDES WLA</b>
					<b>0.1771</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0301710	162.7481	remainder
					<b>0.8137</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.9908</b>	<b>Total WLA</b>
					<b>161.9343</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.16 Right Fork Beaver Creek RM 17.4 to 23.3

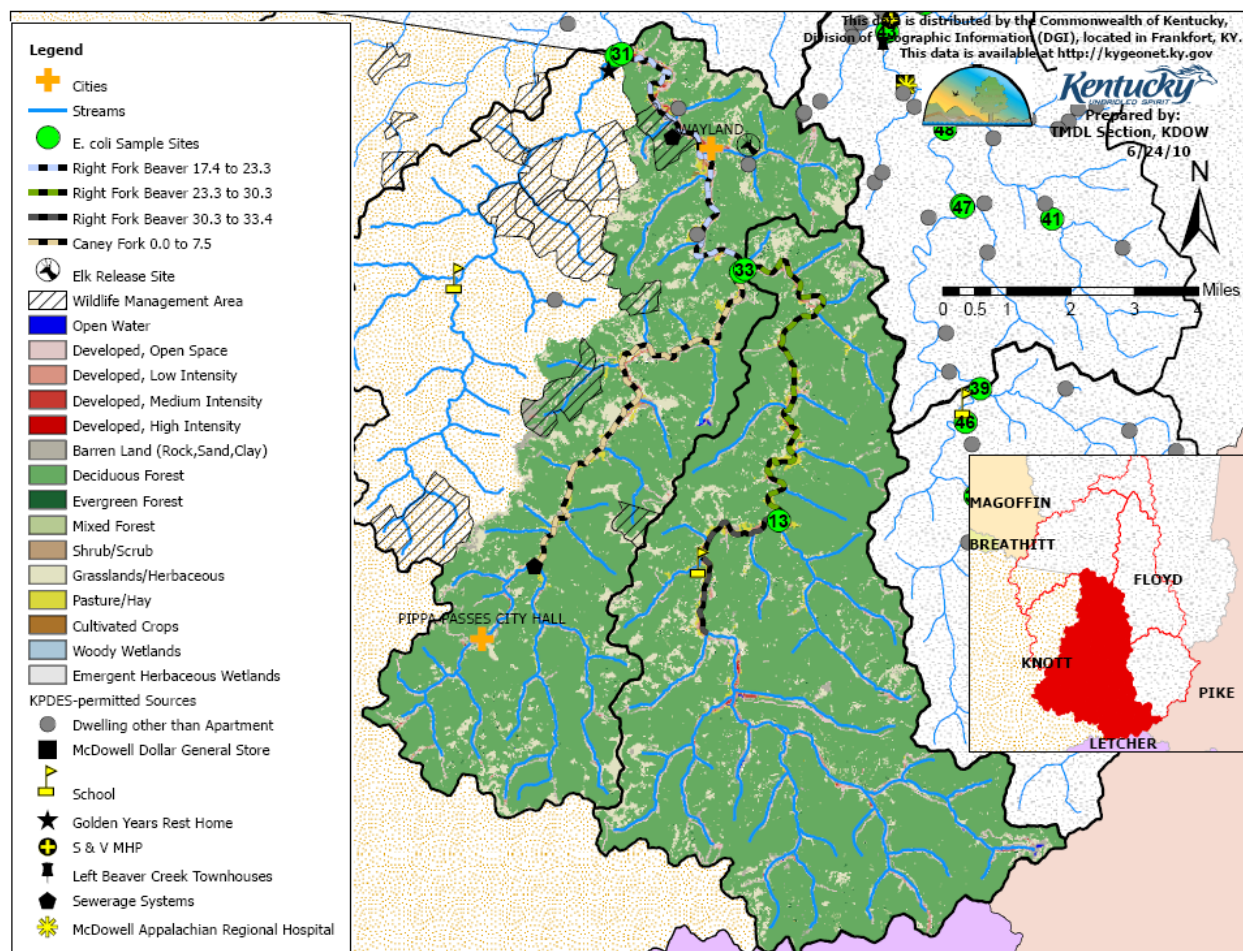


Figure 8.18 Right Fork Beaver Creek RM 17.4 to 23.3

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 32 is under site 33, site 20 is under site 31, and site 40 is under site 47.

Right Fork Beaver Creek at RM 17.4 is a fourth order stream located in Floyd County (Figure 8.18). Its subwatershed encompasses the entire Upper and portions of the Middle Right Fork Beaver Creek subwatersheds. Information about Right Fork Beaver Creek RM 17.4 to 23.3, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.65. It has a catchment of 49,402 acres (77.2 square miles) with an 81% forested and 5.4% developed land cover (Table 8.66). Portions of this subwatershed around Pippa Passes, Alice Lloyd College, and Wayland are sewered (see Figure 5.18). There are three stream water withdrawals in this subwatershed (Table 8.67). Sampling data from site 31 is presented in Table 8.68 and TMDL allocations in Table 8.69.

Table 8.65 Right Fork Beaver Creek RM 17.4 to 23.3 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Right Fork Beaver Creek	Right Fork Beaver Creek 17.4 to 23.3	501863_02	Floyd	49402.07	77.19	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
31	31	17.5	37.46730	-82.83000	104.7	17.4	0.32260	1.43119	103.5914

Table 8.66 Right Fork Beaver Creek RM 17.4 to 23.3 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	20.46	0.03	0.04	
Developed	2666.57	4.17	5.40	1.0
Barren Land	623.28	0.97	1.26	
Forest/Shrubland	39856.27	62.28	80.68	
Grassland/Herbaceous	5325.58	8.32	10.78	
Pasture/ Hay	877.00	1.37	1.78	
Cultivated Crops	28.68	0.04	0.06	
Wetlands	4.22	0.01	0.01	
	49402.07	77.19	100.00	

Table 8.67 Right Fork Beaver Creek RM 17.4 to 23.3 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF (sum of cfs)	1.4311869		

Table 8.68 Right Fork Beaver Creek RM 17.4 to 23.3 Data (Site 31)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/15/07	180	3.172	13.97	0.28
05/30/07	200	3.587	17.55	0.36
06/13/07	300	10.346	75.94	1.54
06/27/07	4100	16.049	1609.87	32.59
07/10/07	150	N/A	N/A	N/A
07/26/07	2900	41.221	2924.66	59.20
08/17/07	430	4.732	49.78	1.01
08/31/07	150	2.551	9.36	0.19
09/14/07	220	2.619	14.10	0.29
09/28/07	110	1.429	3.85	0.08
9/28/27 (QA Sample)	70	N/A	N/A	N/A
10/12/07	70	1.481	2.54	0.05
11/16/07 (outside PCR season)	180	18.054	79.51	1.61
Greatest Concentration	4100			

Table 8.69 TMDL for Right Fork Beaver Creek RM 17.4 to 23.3

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					10391.2139	Existing Load
					<b>608.2662</b>	<b>Total TMDL</b>
					<b>60.8266</b>	<b>MOS</b>
					547.4396	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	94.73	% reduction
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.0108306	<b>0.0636</b>	<b>KPDES WLA</b>
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
35761	KY0105228	WAYLAND STP	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>1.8941</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.3225972	545.5453	remainder
					<b>5.4555</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>7.3496</b>	<b>Total WLA</b>
					<b>540.0899</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



### 8.17 Salt Lick Creek RM 0.0 to 6.8

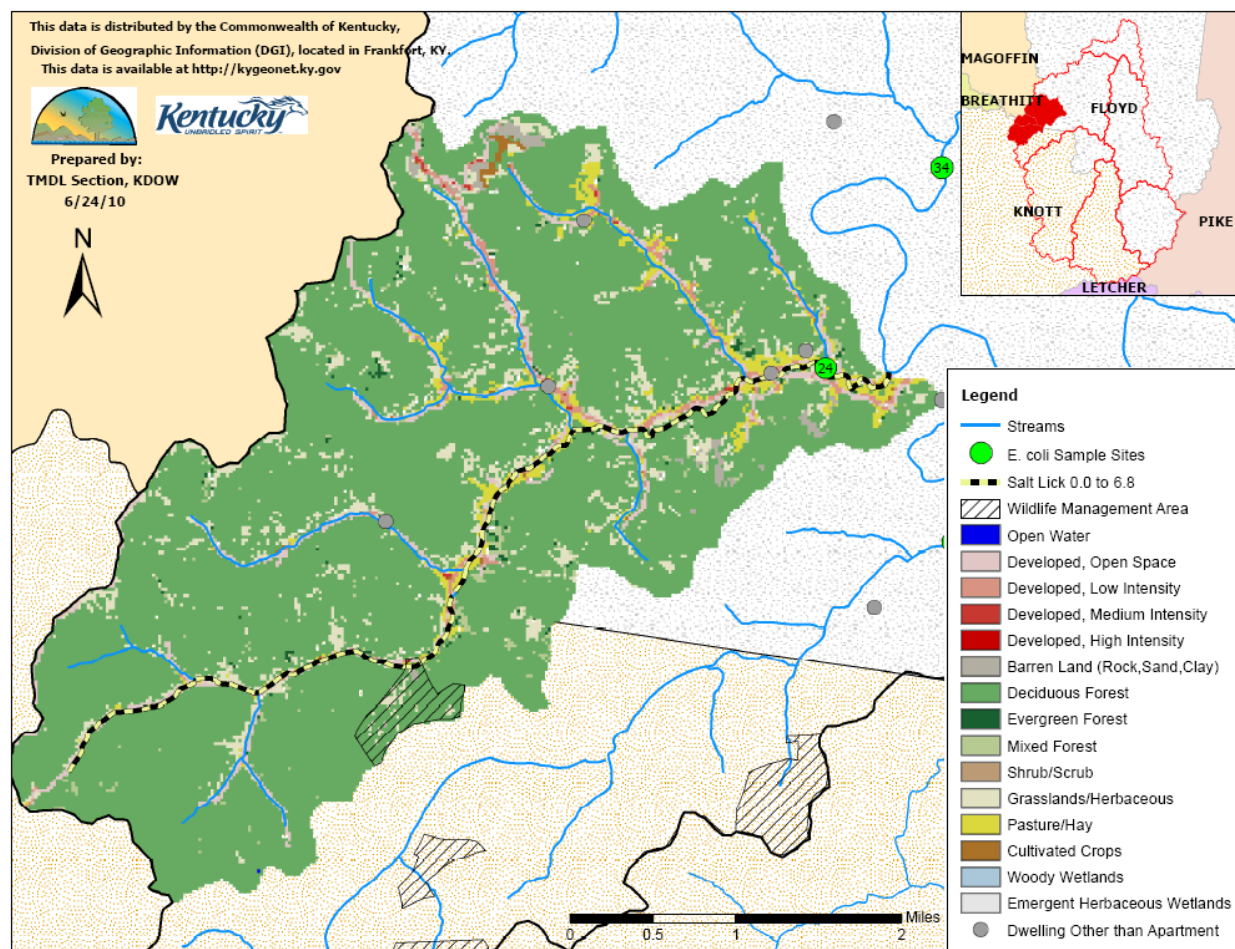


Figure 8.19 Salt Lick Creek RM 0.0 to 6.8

Salt Lick Creek is a third order stream located in the Middle Right Fork Beaver Creek subwatershed in Floyd County (Figure 8.19). Information about Salt Lick Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.70. It has a catchment of 8,114.4 acres (12.7 square miles) with an 84% forested and 5.4% developed land cover (Table 8.71). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 24 is presented in Table 8.72 and TMDL allocations in Table 8.73.

Table 8.70 Salt Lick Creek RM 0.0 to 6.8 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Salt Lick Creek	Salt Lick Creek 0.0 to 6.8	502845 01	Floyd	8114.44	12.68	3rd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
24	24	0.65	37.49563	82.84959	16.8	0	0.00387	0.00000	16.8039

Table 8.71 Salt Lick Creek RM 0.0 to 6.8 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.22	0.00	0.00	
Developed	435.28	0.68	5.36	1.0
Barren Land	53.60	0.08	0.66	
Forest/Shrubland	6807.70	10.64	83.90	
Grassland/Herbaceous	546.49	0.85	6.73	
Pasture/Hay	250.89	0.39	3.09	
Cultivated Crops	18.46	0.03	0.23	
Wetlands	1.78	0.00	0.02	
Totals	8114.44	12.68	100.00	

Table 8.72 Salt Lick Creek RM 0.0 to 6.8 Data (Site 24)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/15/07	4100	1.608	161.30	19.88
05/30/07	755	1.035	19.12	2.36
06/13/07	48000	0.299	351.13	43.27
06/27/07	66000	1.504	2428.57	299.29
07/10/07	800	0.117	2.29	0.28
07/26/07	1400	0.596	20.41	2.52
08/17/07	90	N/A	N/A	N/A
08/31/07	10	N/A	N/A	N/A
8/31/07 (QA Sample)	30	N/A	N/A	N/A
09/14/07	28000	N/A	N/A	N/A
09/28/07	140	N/A	N/A	N/A
11/16/07 (outside PCR season)	1100	N/A	N/A	N/A
Greatest Concentration	66000			

Table 8.73 TMDL for Salt Lick Creek RM 0.0 to 6.8

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					27133.8788	Existing Load
					<b>98.6687</b>	<b>Total TMDL</b>
					<b>9.8669</b>	<b>MOS</b>
					88.8018	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.67	% reduction
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.0225</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0038681	88.7791	remainder
					<b>0.8878</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.9103</b>	<b>Total WLA</b>
					<b>87.8913</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

### 8.18 Turkey Creek RM 0.0 to 5.9

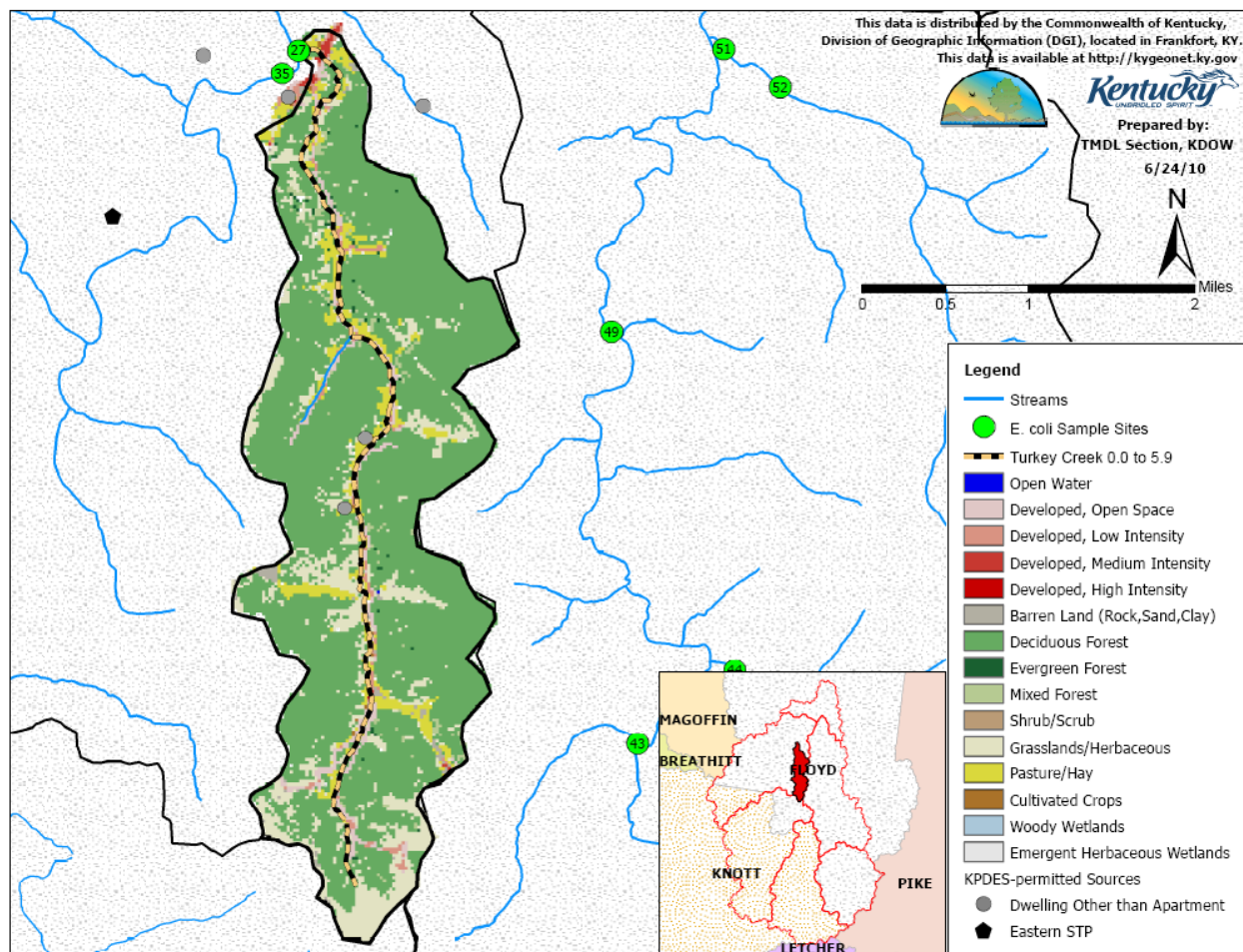


Figure 8.20 Turkey Creek RM 0.0 to 5.9

Turkey Creek is a second order stream located in the Lower Right Fork Beaver Creek subwatershed in Floyd County (Figure 8.20). Information about Turkey Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.74. It has a catchment of 3,403 acres (5.3 square miles) with a 75% forested and 4.6% developed land cover (Table 8.75). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 27 is presented in Table 8.76 and TMDL allocations in Table 8.77.

Table 8.74 Turkey Creek RM 0.0 to 5.9 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Turkey Creek	Turkey Creek 0.0 to 5.9	505598_01	Floyd	3402.79	5.32	2nd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
27	27	0.05	37.53184	82.78877	7	0	0.00232	0.00000	7.0023

Table 8.75 Turkey Creek RM 0.0 to 5.9 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.22	0.00	0.01	
Developed	157.05	0.25	4.62	0.5
Barren Land	23.58	0.04	0.69	
Forest/Shrubland	2545.47	3.98	74.81	
Grassland/Herbaceous	474.93	0.74	13.96	
Pasture/Hay	197.76	0.31	5.81	
Cultivated Crops	3.78	0.01	0.11	
Wetlands	0.00	0.00	0.00	
Total	3402.79	5.32	100.00	

Table 8.76 Turkey Creek RM 0.0 to 5.9 Data (site 27)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/07	1600	10.6148	415.52	122.11
05/30/07	2400	0.389	22.84	6.71
06/13/07	3300	0.2	16.15	4.75
06/27/08	2900	0.411	29.16	8.57
07/10/07	1100	0.114	3.07	0.90
07/26/07	170	0.156	0.65	0.19
08/17/07	59000	N/A	N/A	N/A
08/31/07	1000	N/A	N/A	N/A
09/14/07	16900	N/A	N/A	N/A
09/28/07	4600	N/A	N/A	N/A
10/12/07	3200	N/A	N/A	N/A
11/16/07 (outside PCR season)	2800	0.449	30.76	9.04
Greatest Concentration	59000			



Table 8.77 TMDL for Turkey Creek RM 0.0 to 5.9

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					10107.7083	Existing Load
					<b>41.1161</b>	<b>Total TMDL</b>
					<b>4.1116</b>	<b>MOS</b>
					37.0045	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.63	% reduction
1276	KYG400975	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.0135</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.002320844	36.9909	remainder
					<b>0.1850</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.1985</b>	<b>Total WLA</b>
					<b>36.8059</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



### 8.19 Right Fork Beaver Creek RM 0.0 to 17.4

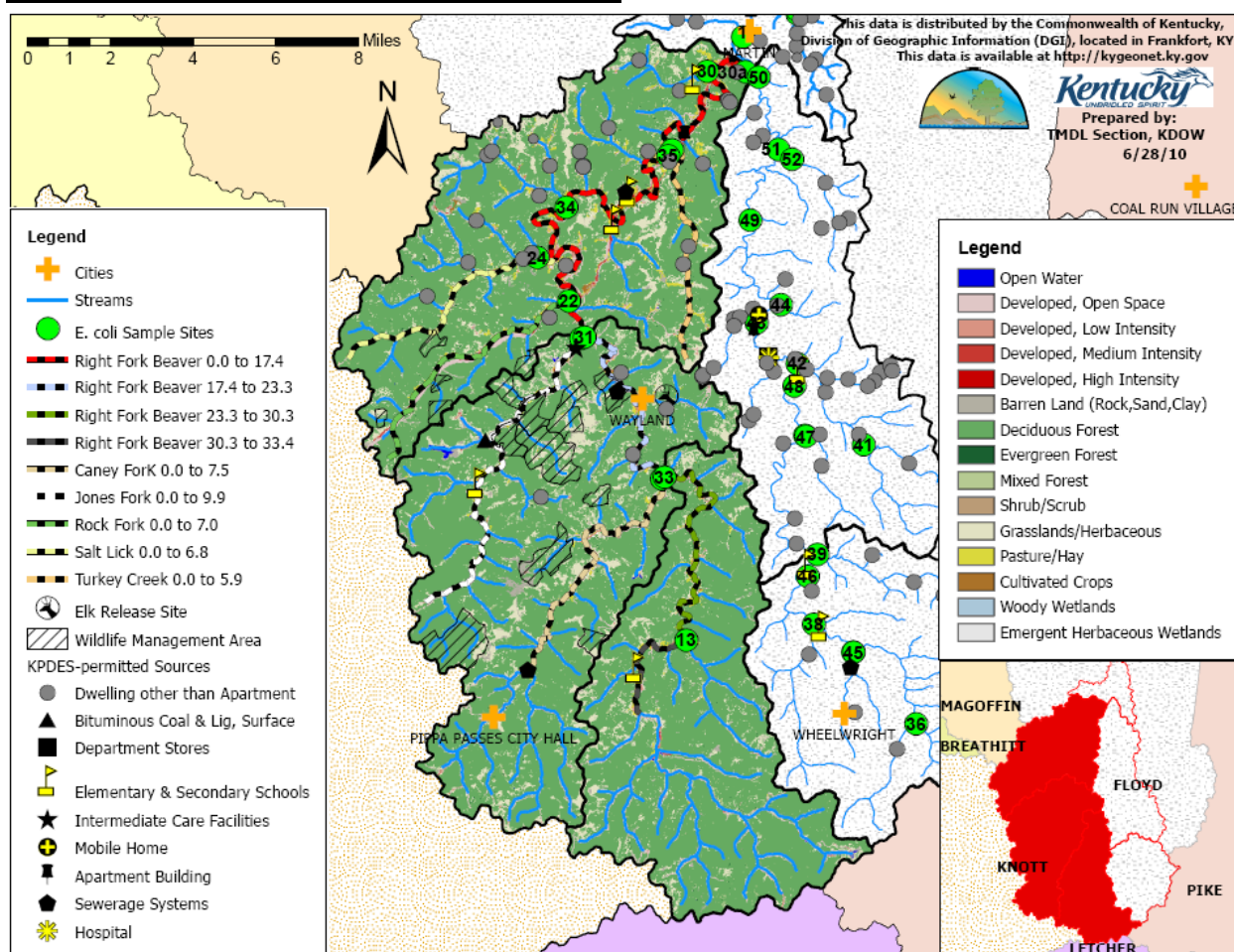


Figure 8.21 Right Fork Beaver Creek RM 0.0 to 17.4

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 32 is under site 33, site 20 is under site 31, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at RM 0.0 is a fourth order stream located in Floyd County (Figure 8.21). Its subwatershed encompasses the entire Upper, Middle, and Lower Right Fork Beaver Creek subwatersheds. Information about Right Fork Beaver Creek RM 0.0 to 17.4, including sample site locations, waterbody identification number (WBID), and MAF is shown in Table 8.78. It has a catchment of 99,096 acres (154.8 square miles) with a 79% forested and 6% developed land cover (Table 8.79). Portions of the subwatershed are sewered (see Figures 5.18 and 5.19). There are three stream water withdrawals in this subwatershed (Table 8.80). This segment had four sample sites and data from sites 30, 30a, 34, and 35 and is presented in Table 8.81. Site 30 had the greatest concentration (13,000) so this concentration was used to set the existing loads and percent reduction for the impaired segment. However, to extrapolate to the end of the impaired segment, the Adjusted MAF from site 30a (204.9477 cfs) was used as the flow to set the TMDL for this impaired segment. The TMDL calculations for sites 30, 30a, 34, and 35 are shown in Appendix E while the TMDL for Right Fork Beaver Creek RM 0.0 to 17.4 is shown in Table 8.82.

Table 8.78 Right Fork Beaver Creek RM 0.0 to 17.4 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Right Fork Beaver Creek	Right Fork Beaver Creek 0.0 to 17.4	501863_01	Floyd	99095.56	154.84	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
30	30	1.4	37.55905	-82.77234	204.7	1.4	0.47809	1.43119	203.7469
30a	30a	0.2	37.55840	-82.75550	205.9	0	0.47887	1.43119	204.9477
34	34	11.2	37.51286	-82.83616	169.3	11.2	0.35818	1.43119	168.2270
35	35	5.7	37.52986	-82.79064	189.1	5.7	0.43554	1.43119	188.1044

Table 8.79 Right Fork Beaver Creek RM 0.0 to 17.4 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	76.27	0.12	0.08	
Developed	5934.03	9.27	5.99	1.0
Barren Land	1207.26	1.89	1.22	
Forest/Shrubland	77884.04	121.69	78.59	
Grassland/Herbaceous	10803.79	16.88	10.90	
Pasture/Hay	3009.60	4.70	3.04	
Cultivated Crops	165.89	0.26	0.17	
Wetlands	14.68	0.02	0.01	
Total	99095.56	154.84	100.00	

Table 8.80 Right Fork Beaver Creek RM 0.0 to 17.4 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF (sum of cfs)	1.43118689		

Table 8.81 Right Fork Beaver Creek RM 0.0 to 17.4 Data (Sites 30, 30a, 34, and 35)

Site 30				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/07	310	70.79	536.90	5.45
05/30/07	310	29.77	225.79	2.29
5/30/07 (QA Sample)	490	N/A	N/A	N/A
06/13/07	180	19.27	84.86	0.86
06/27/07	3700	63.551	5752.85	58.40
07/10/07	220	11.799	63.51	0.64
07/26/07	13000	N/A	N/A	
08/17/07	210	7.202	37.00	0.38
8/17/07 (QA Sample)	140	N/A	N/A	N/A
08/31/07	160	N/A	N/A	N/A
09/14/07	180	N/A	N/A	N/A
09/28/07	330	N/A	N/A	N/A
10/12/07	40	25.701	25.15	0.26
11/16/07 (outside PCR season)	110	0.371	1.00	0.01
Greatest Concentration	13000			
Site 30a				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	560	65.85	902.20	9.10
05/30/08	140	26.3	90.08	0.91
06/13/08	500	26.876	328.77	3.32
06/27/08	250	10.230	62.57	0.63
07/11/08	680	44.002	732.05	7.39
07/31/08	3800	N/A	N/A	N/A
08/08/08	500	22.4328	274.42	2.77
08/22/08	150	7.995	29.34	0.30
09/12/08	110	11.121	29.93	0.30
09/20/08	120	7.015	20.60	0.21
10/17/08	50	8.743	10.70	0.11
10/24/08	90	7.326	16.13	0.16
Greatest Concentration	3800			

Site 34				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/15/07	80	18.505	36.22	0.45
05/30/07	290	24.19	171.63	2.13
06/13/07	390	18.952	180.83	2.24
06/27/07	5900	21.113	3047.62	37.77
07/10/07	300	9.207	67.58	0.84
07/26/07	5100	69.501	8672.01	107.46
08/17/07	150	7.962	29.22	0.36
08/31/07	130	N/A	N/A	N/A
09/14/07	210	3.97	20.40	0.25
09/28/07	100	1.933	4.73	0.06
10/12/07	120	3.6554	10.73	0.13
11/17/07 (outside PCR season)	3300	19.807	1599.16	19.82
11/17/07 (QA Sample)	2100	N/A	N/A	N/A
Greatest Concentration	5900			
Site 35				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/07	140	N/A	N/A	N/A
05/30/07	190	27.832	129.38	1.43
06/13/07	340	N/A	N/A	N/A
06/27/07	3500	N/A	N/A	N/A
6/27/07 (QA Sample)	2400	N/A	N/A	N/A
07/10/07	50	N/A	N/A	N/A
07/26/07	6700	N/A	N/A	N/A
7/26/07 (QA Sample)	1100	N/A	N/A	N/A
08/17/07	170	6.893	28.67	0.32
08/31/07	70	N/A	N/A	N/A
09/14/07	310	N/A	N/A	N/A
09/28/07	640	N/A	N/A	N/A
10/12/07	310	2.925	22.18	0.24
11/17/07 (outside PCR season)	2600	N/A	N/A	N/A
Greatest Concentration	6700			

Table 8.82 TMDL for Right Fork Beaver Creek RM 0.0 to 17.4

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					65184.6057	Existing Load
					<b>1203.4081</b>	<b>Total TMDL</b>
					<b>120.3408</b>	<b>MOS</b>
					1083.0673	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	98.34	% reduction
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.154723	<b>0.9085</b>	<b>KPDES WLA</b>
1352	KY0072974	WARCO HOUSING PROJECT	Apartment Building	0.038681	<b>0.2271</b>	<b>KPDES WLA</b>
35254	KY0079430	ALLEN CENTRAL HIGH SCHOOL	School	0.01702	<b>0.0999</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care Facility	0.015472	<b>0.0908</b>	<b>KPDES WLA</b>
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.009283	<b>0.0545</b>	<b>KPDES WLA</b>
35258	KY0093017	JAMES A DUFF ELEM SCHOOL	School	0.012378	<b>0.0727</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig. Surface	0.004642	<b>0.0273</b>	<b>KPDES WLA</b>
35761	KY0105228	WAYLAND STP	Sewerage System	0.154723	<b>0.9085</b>	<b>KPDES WLA</b>
82092	KY0106755	MAY VALLEY ELEM SCHOOL	School	0.009283	<b>0.0545</b>	<b>KPDES WLA</b>
35260	KY0107051	EASTERN STP	Sewerage System	0.038681	<b>0.2271</b>	<b>KPDES WLA</b>
1196	KYG400590	GOBLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1133	KYG400642	ALLEN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1270	KYG400666	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1222	KYG400730	HOOVER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1343	KYG400778	TURNER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1276	KYG400975	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4327	KYG401073	MAY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
12253	KYG401218	SHEPPARD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15807	KYG401352	EVERIDGE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
33378	KYG401353	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
43224	KYG401548	PRATER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>



AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
47022	KYG401638	LAFERTY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
54879	KYG401772	ISON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
81570	KYG401981	SCARBERRY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
84292	KYG402025	COOK RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
97291	KYG402063	PRATER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>2.8118</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.478867	1080.2555	remainder
					<b>10.8026</b>	<b>Future Growth WLA</b>
					<b>13.6144</b>	<b>Total WLA</b>
					<b>1069.4529</b>	<b>LA</b>

Note: (1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

## 8.20 Arkansas Creek RM 0.0 to 3.6

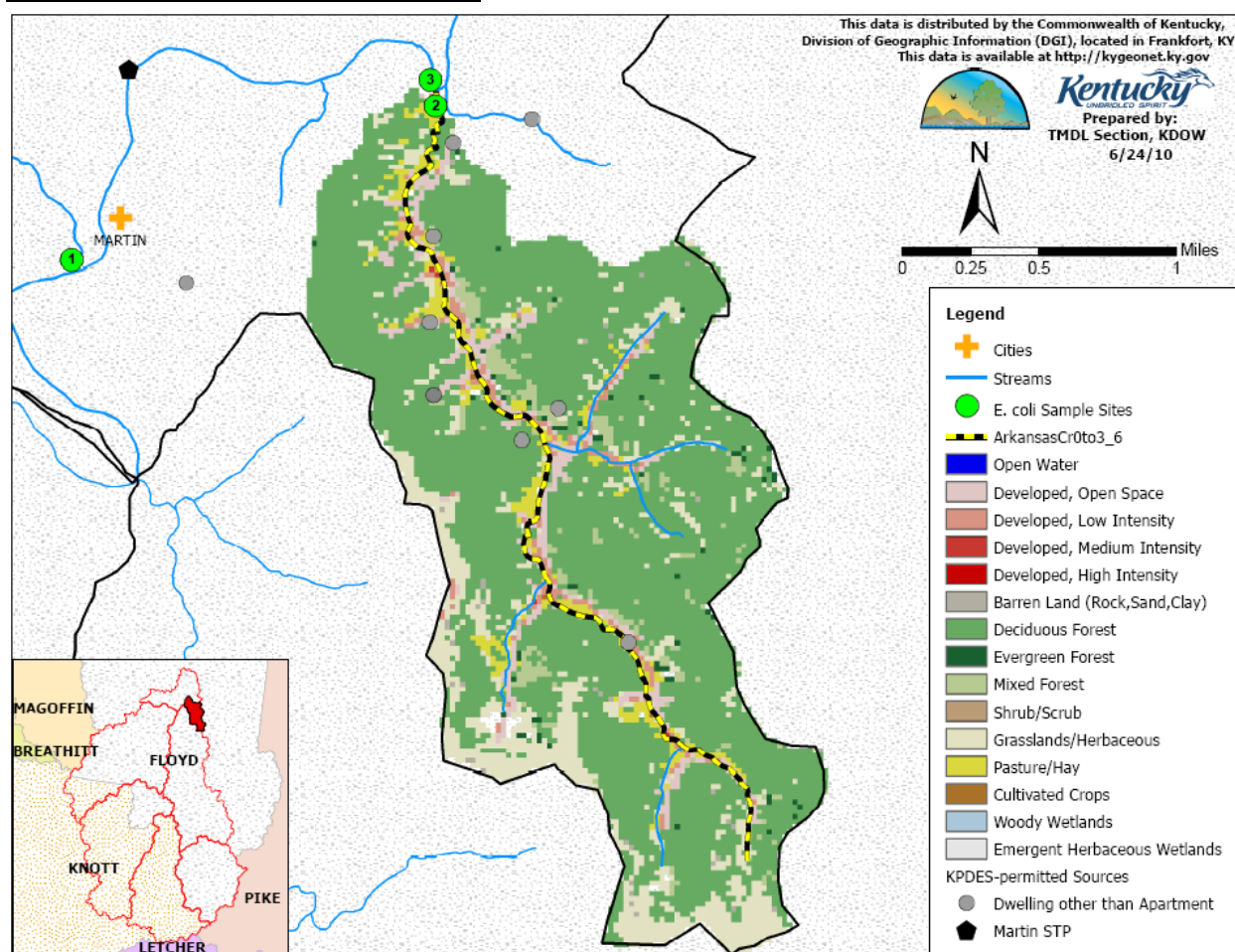


Figure 8.22 Arkansas Creek RM 0.0 to 3.6

Arkansas Creek is a third order stream located in the Mainstem Beaver Creek subwatershed in Floyd County (Figure 8.22). Information about Arkansas Creek, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.83. It has a catchment of 1,990 acres (3.1 square miles) with a 75% forested and 6.7% developed land cover (Table 8.84). This subwatershed is entirely un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 2 is presented in Table 8.85 and TMDL allocations in Table 8.86.

Table 8.83 Arkansas Creek RM 0.0 to 3.6 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Arkansas Creek	Arkansas Creek 0.0 to 3.6	486027_01	Floyd	1990.21	3.11	3rd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
2	2	0.05	37.57810	-82.73170	4.1	0	0.00542	0.00000	4.1054

Table 8.84 Arkansas Creek RM 0.0 to 3.6 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	132.35	0.21	6.65	1.0
Barren Land	8.69	0.01	0.44	
Forest/Shrubland	1497.78	2.34	75.26	
Grassland/Herbaceous	267.38	0.42	13.43	
Pasture/Hay	82.44	0.13	4.14	
Cultivated Crops	1.34	0.00	0.07	
Wetlands	0.22	0.00	0.01	
Totals	1990.21	3.11	100.00	

Table 8.85 Arkansas Creek RM 0.0 to 3.6 Data (Site 2)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	580	0.8	11.35	5.70
05/30/08	70	0.142	0.24	0.12
06/13/08	140	0.155	0.53	0.27
06/27/08	50	0.902	1.10	0.55
07/11/08	680	0.541	9.00	4.52
07/31/08	>80000	1.541	3016.14	1515.49
08/08/08	340	25.5346	212.41	106.73
08/22/08	130	8.3208	26.46	13.30
09/12/08	140	0.0511	0.18	0.09
09/20/08	290	0.013	0.09	0.05
10/17/08	2400	0.14	8.22	4.13
10/24/08	110	0.03	0.08	0.04
Greatest Concentration	80000			

Table 8.86 TMDL for Arkansas Creek RM 0.0 to 3.6

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					8035.3679	Existing Load
					<b>24.1061</b>	<b>Total TMDL</b>
					<b>2.4106</b>	<b>MOS</b>
					21.6955	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.73	% reduction
1304	KYG400339	ROWE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1248	KYG400593	LAWSON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1328	KYG400936	STURGILL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4342	KYG401126	ROSE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4331	KYG401143	COOLEY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
53921	KYG401764	MCKINNEY JR RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
76185	KYG401883	ALLEN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.0315</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.005415	21.6637	remainder
					<b>0.2166</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.2481</b>	<b>Total WLA</b>
					<b>21.4471</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

## 8.21 Buck Branch RM 0.0 to 2.8

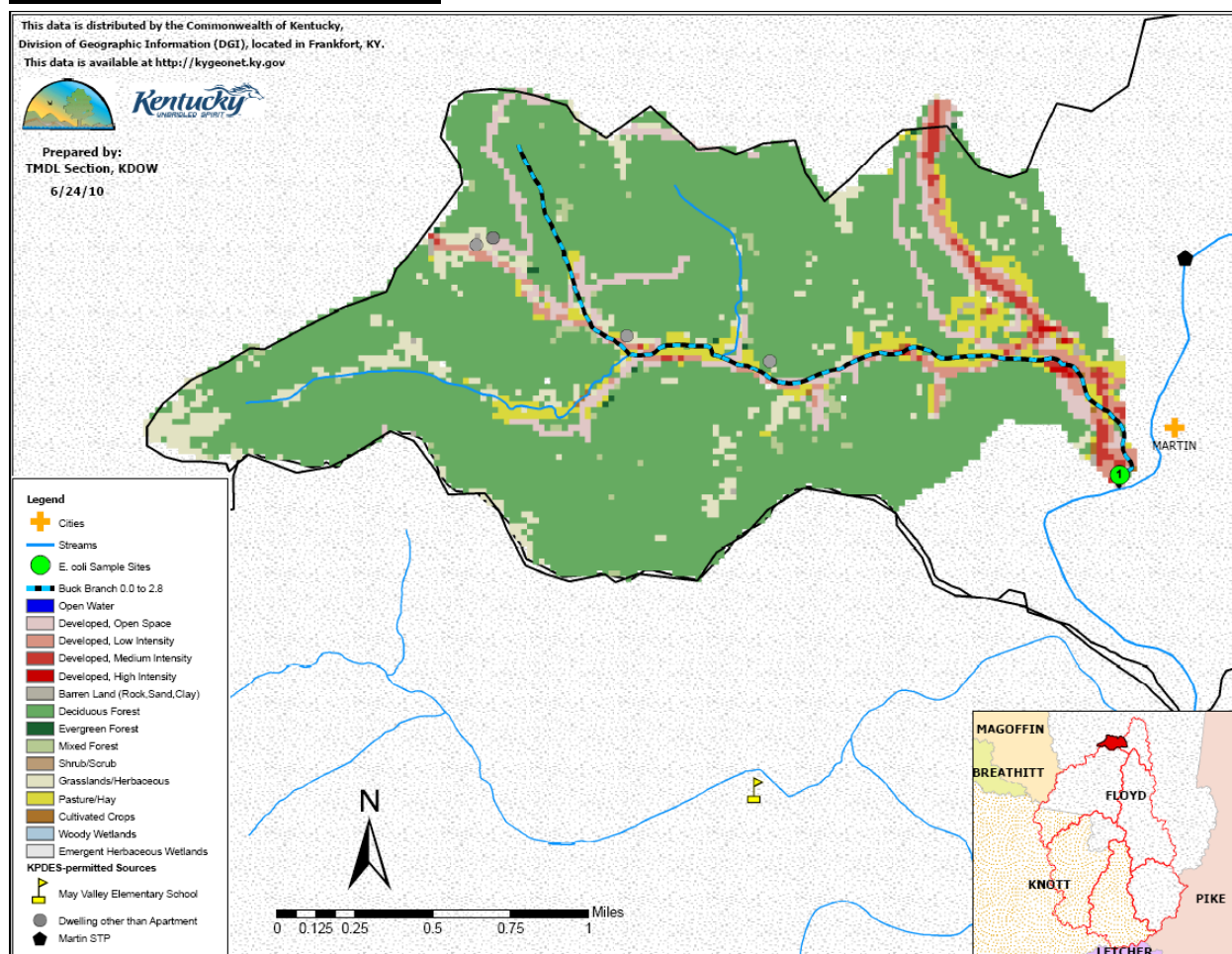


Figure 8.23 Buck Branch RM 0.0 to 2.8

Buck Branch is a second order stream located in the Mainstem Beaver Creek subwatershed in Floyd County (Figure 8.23). Information about Buck Branch, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.87. It has a catchment of 1,840 acres (2.9 square miles) with an 83% forested and 9.7% developed land cover (Table 8.88). This subwatershed is partially sewered near its mouth (see Figure 8.24). There are no stream water withdrawals in this subwatershed. Sampling data from site 1 is presented in Table 8.89 and TMDL allocations in Table 8.90.

Table 8.87 Buck Branch RM 0.0 to 2.8 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Buck Branch	Buck Branch 0.0 to 2.8	488192_01	Floyd	1840.33	2.88	2nd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
1	1	0.05	37.57060	-82.75620	3.7	0	0.00309	0.00000	3.7031

Table 8.88 Buck Branch RM 0.0 to 2.8 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	178.94	0.28	9.72	1.0
Barren Land	5.91	0.01	0.32	
Forest/Shrubland	1534.74	2.40	83.39	
Grassland/Herbaceous	118.88	0.19	6.46	
Pasture/Hay	80.59	0.13	4.38	
Cultivated Crops	3.78	0.01	0.21	
Wetlands	0.24	0.00	0.01	
Totals	1840.33	2.88	100.00	

Table 8.89 Buck Branch RM 0.0 to 2.8 Data (Site 1)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	1700	1.132	47.08	25.58
05/30/08	2500	0.223	13.64	7.41
06/13/08	1700	0.298	12.39	6.73
06/27/08	740	0.117	2.12	1.15
6/27/2008 (QA sample)	460	N/A	N/A	N/A
07/11/08	3000	0.323	23.71	12.88
07/31/08	64000	1.003	1570.51	853.38
08/08/08	2700	0.3072	20.29	11.03
08/22/08	170	0.0885	0.37	0.20
09/12/08	700	0.078	1.34	0.73
09/20/08	560	0.056	0.77	0.42
10/17/08	300	0.117	0.86	0.47
10/24/08	250	0.114	0.70	0.38
Greatest Concentration	64000			



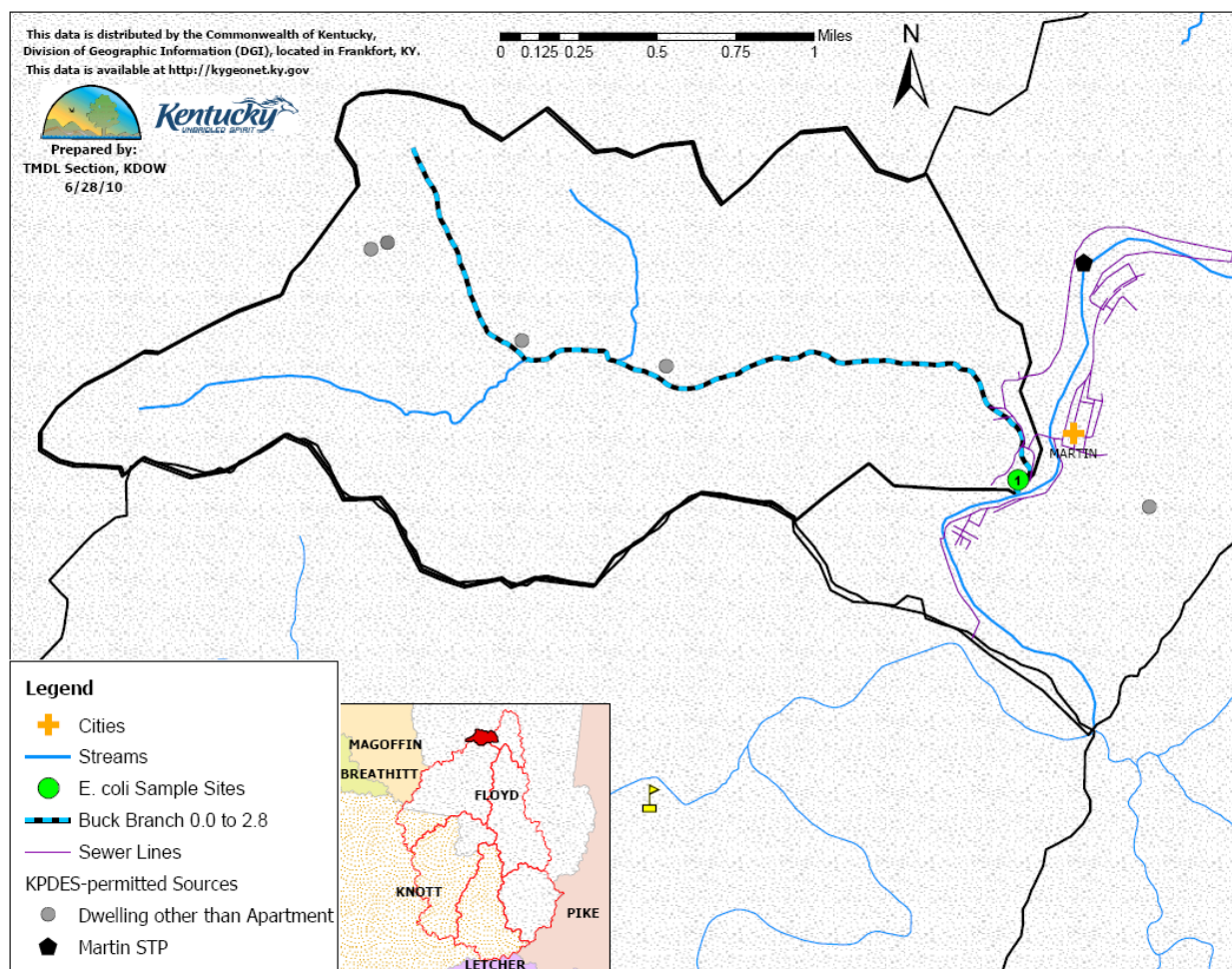


Figure 8.24 Buck Branch Sewer Lines

Table 8.90 TMDL for Buck Branch RM 0.0 to 2.8

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					5798.3369	Existing Load
					<b>21.7438</b>	<b>Total TMDL</b>
					<b>2.1744</b>	<b>MOS</b>
					19.5694	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.66	% reduction
1232	KYG400806	JACOBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1180	KYG400520	DEROSSETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1158	KYG400787	CARRAWAY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
75746	KYG401868	ROWE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>0.0180</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0030945	19.5512	remainder
					<b>0.1955</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>0.2135</b>	<b>Total WLA</b>
					<b>19.3557</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.

## 8.22 Beaver Creek RM 0.0 to 7.1

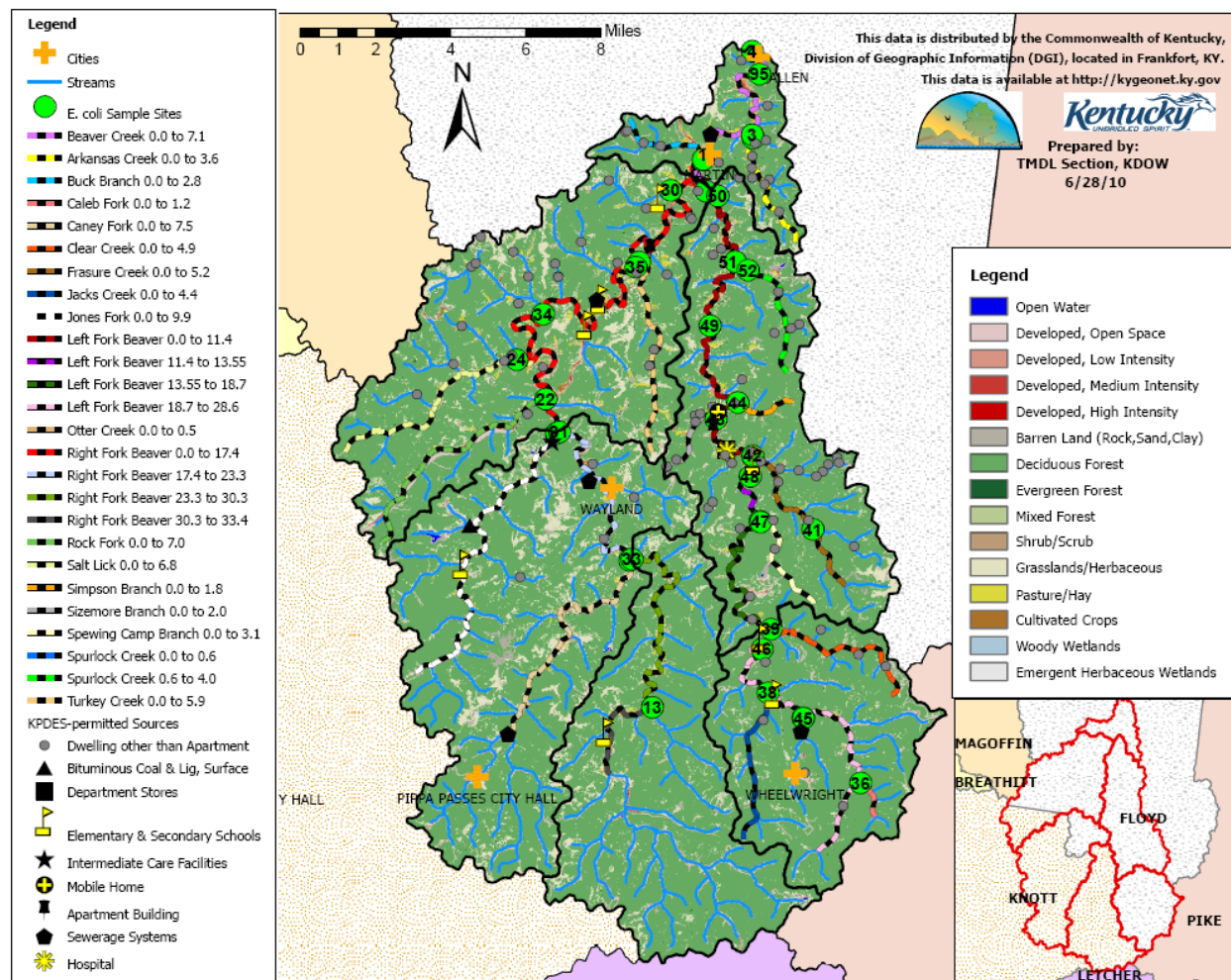


Figure 8.25 Beaver Creek RM 0.0 to 7.1

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Beaver Creek at RM 0.0 is a fifth order stream located in Floyd County (Figure 8.25). Information about Beaver Creek RM 0.0 to 7.1, including sample site location, waterbody identification number (WBID), and MAF is shown in Table 8.91. It has a catchment of 153,670 acres (240.1 square miles) with an 80% forested and 6.5% developed land cover (Table 8.92). Portions of this watershed are sewered; especially in larger cities (see Figures 5.13 through 5.19). There are five stream water withdrawals in this subwatershed (Table 8.93). This segment had three sample sites and data from sites 3, 4, and PRI095 is presented in Table 8.94. Site PRI095 had the greatest concentration (19,000) so this concentration was used to set the existing loads and percent reduction for the impaired segment. However, to extrapolate to the end of the impaired segment, the Adjusted MAF from site 4 (316.8101 cfs) was used as the flow to set the TMDL for this impaired segment. The TMDL calculations for sites 3, 4, and PRI095 are shown in Appendix E while the TMDL for Beaver Creek RM 0.0 to 7.1 is shown in Table 8.95.

Table 8.91 Beaver Creek RM 0.0 to 7.1 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Beaver Creek	Beaver Creek 0.0 to 7.1	486610_01	Floyd	153669.77	240.11	5th order			
Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
3	3	3.9	37.57950	-82.73200	309.8	3.9	1.19400	2.19242	308.8016
PRI095	95	1.1	37.60280	-82.72754	317	1.1	1.20096	2.19242	316.0085
4	4	0.2	37.61178	-82.73071	317.8	0	1.20251	2.19242	316.8101

Table 8.92 Beaver Creek RM 0.0 to 7.1 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	89.41	0.14	0.06	
Developed	9935.56	15.52	6.47	1.0
Barren Land	1724.06	2.69	1.12	
Forest/Shrubland	122227.36	190.98	79.54	
Grassland/Herbaceous	14736.76	23.03	9.59	
Pasture/ Hay	4628.17	7.23	3.01	
Cultivated Crops	305.80	0.48	0.20	
Wetlands	22.68	0.04	0.01	
Totals	153669.77	240.11	100.00	

Table 8.93 Beaver Creek RM 0.0 to 7.1 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
78571	RM 2.4 of Left Fork Beaver Creek	Black Diamond Mining	0.6684028	37.53192	-82.74364
		subtraction from MAF (sum of cfs)	2.19242341		

Table 8.94 Beaver Creek RM 0.0 to 7.1 Data (Sites 3, 4, and PRI095)

Site 3				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	1100	N/A	N/A	N/A
05/30/08	130	43.987	139.90	0.94
06/13/08	430	45.528	478.97	3.21
06/27/08	180	18.869	83.10	0.56
07/11/08	610	60.4	901.42	6.04
7/11/08 (QA Sample)	550	N/A	N/A	N/A
07/31/08	4500	N/A	N/A	N/A
08/08/08	240	0.0075	0.04	0.00
09/12/08	390	23.475	223.99	1.50
09/20/08	90	9.925	21.85	0.15
10/17/08	90	9.692	21.34	0.14
10/24/08	750	9.081	166.63	1.12
Greatest concentration	4500			
Site 4				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	300	N/A	N/A	N/A
05/30/08	290	33.798	239.80	1.56
06/13/08	630	34.654	534.14	3.48
06/27/08	180	22.534	99.24	0.65
07/11/08	1500	64.465	2365.78	15.40
07/31/08	1900	N/A	N/A	N/A
08/08/08	270	23.691	156.50	1.02
08/22/08	250	6.8769	42.06	0.27
09/12/08	90	18.639	41.04	0.27
09/20/08	380	11.850	110.17	0.72
9/20/08 (QA Sample)	190	N/A	N/A	N/A
10/17/08	210	8.251	42.39	0.28
10/24/08	70	11.35	19.44	0.13
10/24/08 (QA Sample)	70	N/A	N/A	N/A
Greatest concentration	1900			
Site PRI095				
Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
5/17/07	2700	N/A	N/A	N/A
6/14/07	656	N/A	N/A	N/A
7/19/07	426	N/A	N/A	N/A
8/14/07	500	N/A	N/A	N/A
9/20/07	268	N/A	N/A	N/A
10/18/07	261	N/A	N/A	N/A
5/21/08	450	N/A	N/A	N/A
6/17/08	19000	N/A	N/A	N/A
7/16/08	220	N/A	N/A	N/A
10/15/08	240	N/A	N/A	N/A
Greatest concentration	19000			



Table 8.95 TMDL for Beaver Creek RM 0.0 to 7.1

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					147268.9800	Existing Load
					<b>1860.2397</b>	<b>Total TMDL</b>
					<b>186.0240</b>	<b>MOS</b>
					1674.2158	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	98.86	% reduction
1262	KY0026921	MARTIN STP	Sewerage System	0.18566748	<b>1.0902</b>	<b>KPDES WLA</b>
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.348126525	<b>2.0441</b>	<b>KPDES WLA</b>
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
1352	KY0072974	WARCO HOUSING PROJECT	Apartment Building	0.038680725	<b>0.2271</b>	<b>KPDES WLA</b>
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.010830603	<b>0.0636</b>	<b>KPDES WLA</b>
35252	KY0079421	MCDOWELL ELEM SCHOOL	School	0.023208435	<b>0.1363</b>	<b>KPDES WLA</b>
35254	KY0079430	ALLEN CENTRAL HIGH SCHOOL	School	0.017019519	<b>0.0999</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care Facility	0.01547229	<b>0.0908</b>	<b>KPDES WLA</b>
1134	KY0085791	MCDOWELL APPALACHIAN REG HOSP	Hospital	0.03094458	<b>0.1817</b>	<b>KPDES WLA</b>
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.009283374	<b>0.0545</b>	<b>KPDES WLA</b>
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.010521157	<b>0.0618</b>	<b>KPDES WLA</b>
35258	KY0093017	JAMES A DUFF ELEM SCHOOL	School	0.012377832	<b>0.0727</b>	<b>KPDES WLA</b>
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.023208438	<b>0.1363</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig. Surface	0.004641686	<b>0.0273</b>	<b>KPDES WLA</b>
1255	KY0096342	LEFT BEAVER CREEK TOWNHOUSES	Apartment Building	0.027850122	<b>0.1635</b>	<b>KPDES WLA</b>
1263	KY0103136	MCDOWELL DOLLAR GENERAL STORE	Department Store	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1305	KY0103233	S & V MHP	Mobile Home Site	0.015317567	<b>0.0899</b>	<b>KPDES WLA</b>



AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
35761	KY0105228	WAYLAND STP	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
82092	KY0106755	MAY VALLEY ELEM SCHOOL	School	0.009283375	<b>0.0545</b>	<b>KPDES WLA</b>
35260	KY0107051	EASTERN STP	Sewerage System	0.038680729	<b>0.2271</b>	<b>KPDES WLA</b>
1304	KYG400339	ROWE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1143	KYG400479	BLACKBURN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1180	KYG400520	DEROSSETT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1218	KYG400567	HICKS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1367	KYG400579	WRIGHT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1196	KYG400590	GOBLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1248	KYG400593	LAWSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1265	KYG400612	MCKINNEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1133	KYG400642	ALLEN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4250	KYG400659	CURRENT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1270	KYG400666	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1315	KYG400677	SHREWBERRY RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1162	KYG400678	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1161	KYG400692	CASE RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1274	KYG400714	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1369	KYG400724	YOUMANS RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1222	KYG400730	HOOVER RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1343	KYG400778	TURNER RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1158	KYG400787	CARRAWAY RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1232	KYG400806	JACOBS RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1168	KYG400854	COLLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1328	KYG400936	STURGILL RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.000773615	0.0045	KPDES WLA

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1276	KYG400975	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4327	KYG401073	MAY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4342	KYG401126	ROSE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4333	KYG401140	DYE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4332	KYG401142	TACKETT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4331	KYG401143	COOLEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
12253	KYG401218	SHEPPARD RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
15635	KYG401271	LAWSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
15807	KYG401352	EVERIDGE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
33378	KYG401353	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74022	KYG401406	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74025	KYG401409	STUMBO RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74062	KYG401442	MULLINS II RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG401516	COLLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
35892	KYG401529	KEATHLEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
36057	KYG401541	MCKINNEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
43224	KYG401548	PRATER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
45073	KYG401582	DINGUS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
45396	KYG401587	GEARHEART RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
45070	KYG401590	HALL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
46144	KYG401601	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
47022	KYG401638	LAFERTY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
48864	KYG401645	DUFF RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
50138	KYG401699	JUSTICE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
53921	KYG401764	MCKINNEY JR RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
54879	KYG401772	ISON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
75141	KYG401851	LITTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
75746	KYG401868	ROWE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
76185	KYG401883	ALLEN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
79842	KYG401936	BENTLEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
81570	KYG401981	SCARBERRY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
84292	KYG402025	COOK RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
97291	KYG402063	PRATER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>7.0609</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	1.202506386	1667.1549	remainder
					<b>16.6715</b>	<b>Future Growth WLA<sup>(1)</sup></b>
					<b>23.7324</b>	<b>Total WLA</b>
					<b>1650.4834</b>	<b>LA</b>

Note:

(1) Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.



8.23 TMDL Summary

A TMDL summary matrix is presented in Table 8.96. The total KPDES-permitted WLA and the Total WLA (KPDES-permitted WLA + Future Growth WLA) are included at the bottom of this table. All loads are expressed in units of billion E. coli colonies per day while percent reduction is expressed as a percentage.

Table 8.96 TMDL Summary Matrix

Loads are in units of billion E. coli colonies/day	Percent Reduction is expressed as a percentage		Caleb Fork RM 0.0 to 1.2	Clear Creek RM 0.0 to 4.9	Jacks Creek RM 0.0 to 4.4	Otter Creek RM 0.0 to 0.5	Left Fork Beaver Creek RM 18.7 to 28.6	Frasure Creek RM 0.0 to 5.2	Simpson Branch RM 0.0 to 1.8	Spurlock Creek RM 0.0 to 0.6	Sizemore Branch RM 0.0 to 2.0	Spewing Camp Branch RM 0.0 to 3.1	Left Fork Beaver Creek RM 11.4 to 13.55	Left Fork Beaver Creek RM 0.0 to 11.4	Right Fork Beaver Creek RM 30.3 to 33.4	Caney Fork RM 0.0 to 7.5	Jones Fork RM 0.0 to 9.9	Right Fork Beaver Creek RM 17.4 to 23.3	Salt Lick Creek RM 0.0 to 6.8	Turkey Creek RM 0.0 to 5.9	Right Fork Beaver Creek RM 0.0 to 17.4	Arkansas Creek RM 0.0 to 3.6	Buck Branch RM 0.0 to 2.8	Beaver Creek 0.0 to 7.1
		Existing Load	5284.6038	13901.0933	1783.7241	9686.2876	69257.5721	27154.7145	3436.0145	6117.7027	3704.6737	4327.5145	90650.1145	126755.5507	1994.2419	549.4722	3243.4191	10391.2139	27133.8788	10107.7083	65184.6057	8035.3679	5798.3369	147268.9800
		Total TMDL	15.8538	41.7033	47.5660	29.0589	207.7727	91.7906	15.2712	29.9643	12.3489	19.9731	315.3047	573.9874	251.9042	191.1208	181.0280	608.2662	98.6687	41.1161	1203.4081	24.1061	21.7438	1860.2397
		MOS	1.5854	4.1703	4.7566	2.9059	20.7773	9.1791	1.5271	2.9964	1.2349	1.9973	31.5305	57.3987	25.1904	19.1121	18.1028	60.8266	9.8669	4.1116	120.3408	2.4106	2.1744	186.0240
		TMDL Target	14.2684	37.5330	42.8094	26.1530	186.9954	82.6115	13.7441	26.9678	11.1140	17.9758	283.7743	516.5887	226.7138	172.0087	162.9252	547.4396	88.8018	37.0045	1083.0673	21.6955	19.5694	1674.2158
AI #	KPDES #	percent reduction	99.73	99.73	97.60	99.73	99.73	99.70	99.60	99.56	99.70	99.58	99.69	99.59	88.63	68.70	94.98	94.73	99.67	99.63	98.34	99.73	99.66	98.86
1133	KYG400642	KPDES WLA																			0.0045			0.0045
1134	KY0085791	KPDES WLA												0.1817										0.1817
1143	KYG400479	KPDES WLA												0.0045										0.0045
1158	KYG400787	KPDES WLA																					0.0045	0.0045
1161	KYG400692	KPDES WLA								0.0045				0.0045										0.0045
1162	KYG400678	KPDES WLA								0.0045				0.0045										0.0045
1168	KYG400854	KPDES WLA									0.0045			0.0045										0.0045
1168	KYG401516	KPDES WLA									0.0045			0.0045										0.0045
1173	KYG400790	KPDES WLA		0.0045									0.0045	0.0045										0.0045
1180	KYG400520	KPDES WLA																					0.0045	0.0045
1182	KYG400614	KPDES WLA						0.0045						0.0045										0.0045
1196	KYG400590	KPDES WLA																			0.0045			0.0045
1199	KYG400603	KPDES WLA																	0.0045		0.0045			0.0045
1202	KYG400969	KPDES WLA						0.0045						0.0045										0.0045
1218	KYG400567	KPDES WLA									0.0045			0.0045										0.0045
1222	KYG400730	KPDES WLA																			0.0045			0.0045
1232	KYG400806	KPDES WLA																					0.0045	0.0045
1237	KYG400753	KPDES WLA		0.0045									0.0045	0.0045										0.0045
1243	KYG400915	KPDES WLA																0.0045			0.0045			0.0045
1248	KYG400593	KPDES WLA																				0.0045		0.0045
1255	KY0096342	KPDES WLA												0.1635										0.1635
1262	KY0026921	KPDES WLA																						1.0902
1263	KY0103136	KPDES WLA												0.0045										0.0045

Loads are in units of billion E. coli colonies/day	Percent Reduction is expressed as a percentage		Caleb Fork RM 0.0 to 1.2	Clear Creek RM 0.0 to 4.9	Jacks Creek RM 0.0 to 4.4	Otter Creek RM 0.0 to 0.5	Left Fork Beaver Creek RM 18.7 to 28.6	Frasure Creek RM 0.0 to 5.2	Simpson Branch RM 0.0 to 1.8	Spurlock Creek RM 0.0 to 0.6	Sizemore Branch RM 0.0 to 2.0	Spewing Camp Branch RM 0.0 to 3.1	Left Fork Beaver Creek RM 11.4 to 13.55	Left Fork Beaver Creek RM 0.0 to 11.4	Right Fork Beaver Creek RM 30.3 to 33.4	Caney Fork RM 0.0 to 7.5	Jones Fork RM 0.0 to 9.9	Right Fork Beaver Creek RM 17.4 to 23.3	Salt Lick Creek RM 0.0 to 6.8	Turkey Creek RM 0.0 to 5.9	Right Fork Beaver Creek RM 0.0 to 17.4	Arkansas Creek RM 0.0 to 3.6	Buck Branch RM 0.0 to 2.8	Beaver Creek 0.0 to 7.1
1265	KYG400612	KPDES WLA																						0.0045
1266	KYG400970	KPDES WLA		0.0045									0.0045	0.0045										0.0045
1269	KYG400478	KPDES WLA						0.0045						0.0045										0.0045
1270	KYG400666	KPDES WLA																			0.0045			0.0045
1274	KYG400714	KPDES WLA											0.0045	0.0045										0.0045
1276	KYG400975	KPDES WLA																		0.0045	0.0045			0.0045
1293	KYG400836	KPDES WLA																0.0045			0.0045			0.0045
1304	KYG400339	KPDES WLA																				0.0045		0.0045
1305	KY0103233	KPDES WLA												0.0899										0.0899
1314	KYG400844	KPDES WLA																	0.0045		0.0045			0.0045
1315	KYG400677	KPDES WLA								0.0045				0.0045										0.0045
1327	KYG400601	KPDES WLA						0.0045						0.0045										0.0045
1328	KYG400936	KPDES WLA																				0.0045		0.0045
1343	KYG400778	KPDES WLA																			0.0045			0.0045
1352	KY0072974	KPDES WLA																			0.2271			0.2271
1367	KYG400579	KPDES WLA												0.0045										0.0045
1369	KYG400724	KPDES WLA									0.0045			0.0045										0.0045
2514	KY0094510	KPDES WLA															0.0273				0.0273			0.0273
2517	KY0083089	KPDES WLA															0.0908				0.0908			0.0908
2527	KY0042854	KPDES WLA														0.9085		0.9085			0.9085			0.9085
4250	KYG400659	KPDES WLA												0.0045										0.0045
4327	KYG401073	KPDES WLA																			0.0045			0.0045
4331	KYG401143	KPDES WLA																				0.0045		0.0045
4332	KYG401142	KPDES WLA												0.0045										0.0045
4333	KYG401140	KPDES WLA											0.0045	0.0045										0.0045
4336	KYG401125	KPDES WLA																0.0045			0.0045			0.0045
4342	KYG401126	KPDES WLA																				0.0045		0.0045
4344	KYG401121	KPDES WLA																		0.0045	0.0045			0.0045
4349	KYG401133	KPDES WLA			0.0045		0.0045						0.0045	0.0045										0.0045
4350	KYG401113	KPDES WLA																	0.0045		0.0045			0.0045
4356	KYG401040	KPDES WLA						0.0045						0.0045										0.0045
4405	KYG401197	KPDES WLA										0.0045	0.0045	0.0045										0.0045

Loads are in units of billion E. coli colonies/day	Percent Reduction is expressed as a percentage		Caleb Fork RM 0.0 to 1.2	Clear Creek RM 0.0 to 4.9	Jacks Creek RM 0.0 to 4.4	Otter Creek RM 0.0 to 0.5	Left Fork Beaver Creek RM 18.7 to 28.6	Frasure Creek RM 0.0 to 5.2	Simpson Branch RM 0.0 to 1.8	Spurlock Creek RM 0.0 to 0.6	Sizemore Branch RM 0.0 to 2.0	Spewing Camp Branch RM 0.0 to 3.1	Left Fork Beaver Creek RM 11.4 to 13.55	Left Fork Beaver Creek RM 0.0 to 11.4	Right Fork Beaver Creek RM 30.3 to 33.4	Caney Fork RM 0.0 to 7.5	Jones Fork RM 0.0 to 9.9	Right Fork Beaver Creek RM 17.4 to 23.3	Salt Lick Creek RM 0.0 to 6.8	Turkey Creek RM 0.0 to 5.9	Right Fork Beaver Creek RM 0.0 to 17.4	Arkansas Creek RM 0.0 to 3.6	Buck Branch RM 0.0 to 2.8	Beaver Creek 0.0 to 7.1
12253	KYG401218	KPDES WLA																			0.0045			0.0045
15635	KYG401271	KPDES WLA												0.0045										0.0045
15655	KYG401296	KPDES WLA																			0.0045			0.0045
15807	KYG401352	KPDES WLA																			0.0045			0.0045
33378	KYG401353	KPDES WLA																			0.0045			0.0045
33945	KY0077542	KPDES WLA													0.0636			0.0636						0.0636
35251	KY0089435	KPDES WLA					0.0618						0.0618	0.0618										0.0618
35252	KY0079421	KPDES WLA						0.1363						0.1363										0.1363
35254	KY0079430	KPDES WLA																			0.0999			0.0999
35258	KY0093017	KPDES WLA																			0.0727			0.0727
35260	KY0093912	KPDES WLA					0.1363						0.1363	0.1363										0.1363
35260	KY0107051	KPDES WLA																			0.2271			0.2271
35359	KY0087076	KPDES WLA															0.0545				0.0545			0.0545
35761	KY0105228	KPDES WLA																0.9085			0.9085			0.9085
35887	KYG401533	KPDES WLA						0.0045						0.0045										0.0045
35892	KYG401529	KPDES WLA																						0.0045
36057	KYG401541	KPDES WLA																						0.0045
40534	KY0028789	KPDES WLA				2.0441	2.0441						2.0441	2.0441										2.0441
43120	KYG401540	KPDES WLA																			0.0045			0.0045
43224	KYG401548	KPDES WLA																			0.0045			0.0045
44695	KYG401580	KPDES WLA				0.0045	0.0045						0.0045	0.0045										0.0045
45070	KYG401590	KPDES WLA												0.0045										0.0045
45073	KYG401582	KPDES WLA												0.0045										0.0045
45396	KYG401587	KPDES WLA												0.0045										0.0045
46144	KYG401601	KPDES WLA								0.0045				0.0045										0.0045
46147	KYG401603	KPDES WLA															0.0045				0.0045			0.0045
47022	KYG401638	KPDES WLA																			0.0045			0.0045
48864	KYG401645	KPDES WLA												0.0045										0.0045
48897	KYG401646	KPDES WLA					0.0045						0.0045	0.0045										0.0045
49354	KYG401654	KPDES WLA										0.0045	0.0045	0.0045										0.0045
50021	KYG401692	KPDES WLA						0.0045						0.0045										0.0045
50138	KYG401699	KPDES WLA																						0.0045

Loads are in units of billion E. coli colonies/day	Percent Reduction is expressed as a percentage		Caleb Fork RM 0.0 to 1.2	Clear Creek RM 0.0 to 4.9	Jacks Creek RM 0.0 to 4.4	Otter Creek RM 0.0 to 0.5	Left Fork Beaver Creek RM 18.7 to 28.6	Frasure Creek RM 0.0 to 5.2	Simpson Branch RM 0.0 to 1.8	Spurlock Creek RM 0.0 to 0.6	Sizemore Branch RM 0.0 to 2.0	Spewing Camp Branch RM 0.0 to 3.1	Left Fork Beaver Creek RM 11.4 to 13.55	Left Fork Beaver Creek RM 0.0 to 11.4	Right Fork Beaver Creek RM 30.3 to 33.4	Caney Fork RM 0.0 to 7.5	Jones Fork RM 0.0 to 9.9	Right Fork Beaver Creek RM 17.4 to 23.3	Salt Lick Creek RM 0.0 to 6.8	Turkey Creek RM 0.0 to 5.9	Right Fork Beaver Creek RM 0.0 to 17.4	Arkansas Creek RM 0.0 to 3.6	Buck Branch RM 0.0 to 2.8	Beaver Creek 0.0 to 7.1
50627	KYG401721	KPDES WLA																		0.0045	0.0045			0.0045
50950	KYG401730	KPDES WLA																	0.0045		0.0045			0.0045
53921	KYG401764	KPDES WLA																				0.0045		0.0045
54879	KYG401772	KPDES WLA																			0.0045			0.0045
71436	KYG401809	KPDES WLA						0.0045						0.0045										0.0045
74022	KYG401406	KPDES WLA							0.0045					0.0045										0.0045
74025	KYG401409	KPDES WLA												0.0045										0.0045
74062	KYG401442	KPDES WLA												0.0045	0.0045									0.0045
74181	KYG401470	KPDES WLA					0.0045							0.0045	0.0045									0.0045
74185	KYG401475	KPDES WLA																	0.0045		0.0045			0.0045
74243	KYG401821	KPDES WLA						0.0045							0.0045									0.0045
75141	KYG401851	KPDES WLA													0.0045									0.0045
75556	KYG401857	KPDES WLA																				0.0045		0.0045
75746	KYG401868	KPDES WLA																					0.0045	0.0045
76078	KYG401876	KPDES WLA																			0.0045			0.0045
76185	KYG401883	KPDES WLA																				0.0045		0.0045
79525	KYG401931	KPDES WLA						0.0045							0.0045									0.0045
79842	KYG401936	KPDES WLA																						0.0045
81193	KYG401970	KPDES WLA						0.0045							0.0045									0.0045
81570	KYG401981	KPDES WLA																				0.0045		0.0045
82092	KY0106755	KPDES WLA																				0.0545		0.0545
82471	KYG402002	KPDES WLA													0.0045									0.0045
84292	KYG402025	KPDES WLA																				0.0045		0.0045
97291	KYG402063	KPDES WLA																				0.0045		0.0045
103052	KYG402117	KPDES WLA						0.0045							0.0045									0.0045
1297	KY0027413	KPDES WLA																						0.0000
		Total KPDES WLA	0.000	0.0135	0.0045	2.0486	2.2602	0.1903	0.0045	0.018	0.018	0.009	2.2962	3.0206	0.0636	0.9085	0.1771	1.8941	0.0225	0.0135	2.8104	0.0315	0.018	7.060855
		remainder	14.2684	37.5193	42.8048	24.1043	184.7351	82.4207	13.7395	26.9497	11.0959	17.9667	281.4776	513.5661	226.6502	171.1002	162.7481	545.5453	88.7791	36.9909	1080.2555	21.6637	19.5512	1667.1549
		Future Growth WLA <sup>(1)</sup>	0.0713	0.3752	0.4280	0.2410	1.8474	0.8242	0.0687	0.2695	0.1110	0.0898	2.8148	5.1357	2.2665	0.8555	0.8137	5.4555	0.8878	0.1850	10.8026	0.2166	0.1955	16.6715
		Total WLA	0.07134	0.3887	0.4325	2.2896	4.1076	1.0145	0.0732	0.2875	0.129	0.0988	5.111	8.1563	2.3301	1.764	0.9908	7.3496	0.9103	0.1985	13.613	0.2481	0.2135	23.7324
		LA	14.1971	37.1441	42.3768	23.8633	182.8877	81.5965	13.6708	26.6802	10.9849	17.8769	278.6628	508.4304	224.3837	170.2447	161.9343	540.0899	87.8913	36.8059	1069.4529	21.4471	19.3557	1650.4834

Note: <sup>(1)</sup> Any expanding or future KPDES-permitted point source will receive its WLA from the Future Growth WLA and must meet permit limits based on the Water Quality Standards in 401 KAR 10:031.8.24

#### **8.24 Translation of WLAs into Permit Limits**

All WLAs will be translated into KPDES permit limits as an E. coli effluent gross limit of 130 colonies/100 ml as a monthly average and 240 colonies/100 ml as a maximum weekly average or as a Fecal coliform effluent gross limit of 200 colonies/100 ml as a monthly average and 400 colonies/100 ml as a maximum weekly average.

## **9.0 Implementation**

Section 303(e) of the Clean Water Act and 40 CFR Part 130, Section 130.5, require states to have a continuing planning process (CPP) composed of several parts specified in the Act and the regulation. The CPP provides an outline of agency programs and the available authority to address water issues. Under the CPP umbrella, the Watershed Management Branch will provide technical support and leadership with developing and implementing watershed plans to address water quality and quantity problems and threats. Developing watershed plans enables more effective targeting of limited restoration funds and resources, thus improving environmental benefit, protection and recovery.

The in-stream pathogen data used to develop the TMDLs for impaired segments in the Beaver Creek Watershed do not allow loads to be quantitatively allocated to the different sources within the watershed. Therefore, no specific recommendations for remediation are offered until additional watershed planning is conducted. Development of a watershed plan will provide an integrative approach for identifying and describing what actions that should be taken in order to meet WQC, how the actions will be accomplished, who will undertake the actions and when the actions will be completed. This TMDL will provide a foundation for developing a detailed watershed plan. At present, no watershed plan is under development for the Beaver Creek watershed. However, KDOW welcomes future planning efforts by third parties (i.e., local stakeholders) for watershed plans and BMP implementation.

## **10.0 Public Participation**

This TMDL was published for a 30-day public comment beginning August 4, 2010 and ending September 3, 2010. A notification was sent to all newspapers in the Commonwealth of Kentucky and advertisements were purchased in three local newspapers in the vicinity of the Beaver Creek watershed: The Floyd County Times (Prestonsburg, KY in Floyd County, circulation 3923), The Appalachian News-Express (Pikeville, KY in Pike County, circulation 7100), and the Troublesome Creek Times (Hindman, KY in Knott County, circulation 4665). Additionally, the public notice was distributed electronically through the 'Nonpoint Source Pollution Control' mailing list and via SNIPS, an electronic news bulletin sent to approximately 1,600 entities. No public comments were received on this TMDL document.



## **11.0 References**

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## Appendix A. Land Cover Definitions

Table A.1 National Land-Cover Database Class Descriptions (taken from Homer et. al., 2004)

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11. **Open Water** - All areas of open water, generally with less than 25% cover of vegetation or soil.
21. **Developed, Open Space** - Includes areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot single-family housing units, parks, golf courses, and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes
22. **Developed, Low Intensity** - Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20-49 percent of total cover. These areas most commonly include single-family housing units.
23. **Developed, Medium Intensity** - Includes areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50-79 percent of the total cover. These areas most commonly include single-family housing units.
24. **Developed, High Intensity** - Includes highly developed areas where people reside or work in high numbers. Examples include apartment complexes, row houses and commercial/industrial. Impervious surfaces account for 80 to 100 percent of the total cover.
31. **Barren Land (Rock/Sand/Clay)** - Barren areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15% of total cover.
41. **Deciduous Forest** - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
42. **Evergreen Forest** - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
43. **Mixed Forest** - Areas dominated by trees generally greater than 5 meters tall, and greater than 20% of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.
52. **Shrub/Scrub** - Areas dominated by shrubs; less than 5 meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
71. **Grassland/Herbaceous** - Areas dominated by grammanoid or herbaceous vegetation, generally greater than 80% of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
81. **Pasture/Hay** - Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
82. **Cultivated Crops** - Areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.
90. **Woody Wetlands** - Areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
95. **Emergent Herbaceous Wetlands** - Areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
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## Appendix B. E. coli Monitoring Data

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
1	Buck Branch 0.0 to 2.8	37.5706	-82.7562	05/16/08	1700	1.132
				05/30/08	2500	0.223
				06/13/08	1700	0.298
				06/27/08	740	0.117
				6/27/08 (QA sample)	460	N/A
				07/11/08	3000	0.323
				07/31/08	64000	1.003
				08/08/08	2700	0.3072
				08/22/08	170	0.0885
				09/12/08	700	0.078
				09/20/08	560	0.056
				10/17/08	300	0.117
				10/24/08	250	0.114
2	Arkansas Creek 0.0 to 3.6	37.5781	-82.7317	05/16/08	580	0.8
				05/30/08	70	0.142
				06/13/08	140	0.155
				06/27/08	50	0.902
				07/11/08	680	0.541
				07/31/08	>80000	1.541
				08/08/08	340	25.5346
				08/22/08	130	8.3208
				09/12/08	140	0.0511
				09/20/08	290	0.013
				10/17/08	2400	0.14
				10/24/08	110	0.03
3	Beaver Creek 0.0 to 7.1	37.5795	-82.732	05/16/08	1100	N/A
				05/30/08	130	43.987
				06/13/08	430	45.528
				06/27/08	180	18.869
				07/11/08	610	60.4
				7/11/08 (QA Sample)	550	N/A
				07/31/08	4500	N/A
				08/08/08	240	0.0075
				09/12/08	390	23.475
				09/20/08	90	9.925
				10/17/08	90	9.692
				10/24/08	750	9.081



Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
PRI095	Beaver Creek 0.0 to 7.1	37.6028	-82.72754	5/17/07	2700	N/A
				6/14/07	656	N/A
				7/19/07	426	N/A
				8/14/07	500	N/A
				9/20/07	268	N/A
				10/18/07	261	N/A
				5/21/08	450	N/A
				6/17/08	19000	N/A
				7/16/08	220	N/A
				10/15/08	240	N/A
4	Beaver Creek 0.0 to 7.1	37.61178	-82.73071	05/16/08	300	N/A
				05/30/08	290	33.798
				06/13/08	630	34.654
				06/27/08	180	22.534
				07/11/08	1500	64.465
				07/31/08	1900	N/A
				08/08/08	270	23.691
				08/22/08	250	6.8769
				09/12/08	90	18.639
				09/20/08	380	11.850
				9/20/08 (QA Sample)	190	N/A
				10/17/08	210	8.251
				10/24/08	70	11.35
				10/24/08 (QA Sample)	70	N/A
13	Right Fork Beaver Creek 30.3 to 33.4	37.35989	-82.78935	05/15/07	260	18.872
				05/30/07	190	1.976
				06/13/07	320	4.861
				06/27/07	560	55.059
				07/10/07	370	1.537
				7/10/07 (QA Sample)	330	1.537
				07/26/07	1900	14.412
				08/17/07	320	1.384
				08/31/07	210	N/A
				09/13/07	110	1.829
				09/28/07	110	0.59
				10/12/07	<10	0.612
				10/12/07 (QA Sample)	<10	0.612
				11/16/07	430	1.4244

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
20	Jones Fork 0.0 to 9.9	37.46684	-82.83148	05/15/07	140	1.219
				05/30/07	320	3.587
				06/13/07	280	2.101
				06/27/07	3100	2.128
				07/10/07	370	1.062
				07/26/07	4300	4.294
				08/17/07	20	0.455
				08/31/07	290	0.217
				09/14/07	180	0.304
				9/14/07 (QA/Sample)	70	N/A
				09/28/07	170	0.107
				10/12/07	<10	0.035
				11/16/07	120	4.091
22	Rock Fork 0.0 to 7.0	37.48001	-82.83621	05/16/07	160	5.226
				05/30/07	70	2.975
				06/13/07	50	2.315
				06/27/07	1600	2.025
				07/10/07	80	1.705
				07/26/07	1900	1.887
				08/17/07	60	1.485
				08/31/07	60	N/A
				09/14/07	200	1.924
				09/28/07	110	0.955
				10/12/07	100	1.023
				10/12/07 (QA Sample)	90	N/A
				11/16/07	600	1.597
24	Salt Lick Creek 0.0 to 6.8	37.49563	82.84959	05/15/07	4100	1.608
				05/30/07	755	1.035
				06/13/07	48000	0.299
				06/27/07	66000	1.504
				07/10/07	800	0.117
				07/26/07	1400	0.596
				08/17/07	90	N/A
				08/31/07	10	N/A
				8/31/07 (QA Sample)	30	N/A
				09/14/07	28000	N/A
				09/28/07	140	N/A
				11/16/07	1100	N/A

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
27	Turkey Creek 0.0 to 5.9	37.53184	82.78877	05/16/07	1600	10.6148
				05/30/07	2400	0.389
				06/13/07	3300	0.2
				06/27/08	2900	0.411
				07/10/07	1100	0.114
				07/26/07	170	0.156
				08/17/07	59000	N/A
				08/31/07	1000	N/A
				09/14/07	16900	N/A
				09/28/07	4600	N/A
				10/12/07	3200	N/A
				11/16/07	2800	0.449
30	Right Fork Beaver Creek 0.0 to 17.4	37.55905	-82.77234	05/16/07	310	70.79
				05/30/07	310	29.77
				5/30/07 (QA Sample)	490	N/A
				06/13/07	180	19.27
				06/27/07	3700	63.551
				07/10/07	220	11.799
				07/26/07	13000	N/A
				08/17/07	210	7.202
				8/17/07 (QA Sample)	140	N/A
				08/31/07	160	N/A
				09/14/07	180	N/A
				09/28/07	330	N/A
				10/12/07	40	25.701
				11/16/07	110	0.371
30a	Right Fork Beaver Creek 0.0 to 17.4	37.5584	-82.7555	05/16/08	560	65.85
				05/30/08	140	26.3
				06/13/08	500	26.876
				06/27/08	250	10.230
				07/11/08	680	44.002
				07/31/08	3800	N/A
				08/08/08	500	22.4328
				08/22/08	150	7.995
				09/12/08	110	11.121
				09/20/08	120	7.015
				10/17/08	50	8.743
				10/24/08	90	7.326

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
31	Right Fork Beaver Creek 17.4 to 23.3	37.4673	-82.83	05/15/07	180	3.172
				05/30/07	200	3.587
				06/13/07	300	10.346
				06/27/07	4100	16.049
				07/10/07	150	N/A
				07/26/07	2900	41.221
				08/17/07	430	4.732
				08/31/07	150	2.551
				09/14/07	220	2.619
				09/28/07	110	1.429
				9/28/07 (QA Sample)	70	N/A
				10/12/07	70	1.481
				11/16/07	180	18.054
32	Caney Fork 0.0 to 7.5	37.41672	-82.79799	05/15/07	100	151.9515
				05/30/07	300	4.797
				06/13/07	110	2.131
				06/27/07	430	5.698
				07/10/07	210	1.233
				07/26/07	690	20.379
				08/17/07	400	1.705
				08/31/07	260	N/A
				09/14/07	170	0.105
				09/28/07	30	0.084
				10/12/07	<10	0.275
				11/16/07	710	1.2337
33	Right Fork Beaver Creek 23.3 to 30.3	37.4173	-82.79682	05/15/07	150	431.7758
				05/30/07	<10	11.65
				06/13/07	120	5.073
				06/27/07	330	4.539
				07/10/07	150	2.844
				07/26/07	2500	20.381
				08/17/07	100	2.148
				08/31/07	150	N/A
				09/14/07	180	2.088
				09/28/07	10	N/A
				10/12/07	20	N/A
				11/16/07	290	2.4992

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
34	Right Fork Beaver Creek 0.0 to 17.4	37.51286	-82.83616	05/15/07	80	18.505
				05/30/07	290	24.19
				06/13/07	390	18.952
				06/27/07	5900	21.113
				07/10/07	300	9.207
				07/26/07	5100	69.501
				08/17/07	150	7.962
				08/31/07	130	N/A
				09/14/07	210	3.97
				09/28/07	100	1.933
				10/12/07	120	3.6554
				11/17/07	3300	19.807
				11/17/07 (QA Sample)	2100	N/A
35	Right Fork Beaver Creek 0.0 to 17.4	37.52986	-82.79064	05/16/07	140	N/A
				05/30/07	190	27.832
				06/13/07	340	N/A
				06/27/07	3500	N/A
				6/27/07 (QA Sample)	2400	N/A
				07/10/07	50	N/A
				07/26/07	6700	N/A
				7/26/07 (QA Sample)	1100	N/A
				08/17/07	170	6.893
				08/31/07	70	N/A
				09/14/07	310	N/A
				09/28/07	640	N/A
				10/12/07	310	2.925
				11/17/07	2600	N/A
36	Caleb Fork 0.0 to 1.2	37.32805	-82.68984	05/16/08	11000	1.085
				05/30/08	17000	4.3302
				06/13/08	3400	N/A
				6/13/08 (QA Sample)	2900	N/A
				06/27/08	3000	0.326
				07/11/08	5300	N/A
				07/31/08	17000	0.308
				08/08/08	3600	0.260
				08/22/08	800	0.07
				09/12/08	2600	0.1
				09/20/08	5000	0.0334
				10/17/08	>80000	0.211
				10/24/08	240	0.088

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
37	Otter Creek 0.0 to 0.5	37.35389	-82.7165	05/16/08	6000	1.461
				05/30/08	38000	6.935
				06/13/08	2000	1.1368
				06/27/08	490	0.744
				07/11/08	2700	1.787
				07/31/08	>80000	1.959
				08/08/08	730	0.931
				08/22/08	570	0.224
				09/12/08	2900	0.875
				09/20/08	>80000	0.3732
				10/17/08	2400	0.417
				10/24/08	250	0.289
38	Jacks Creek 0.0 to 4.4	37.36347	-82.73338	05/16/08	480	2.623
				05/30/08	700	17.677
				06/13/08	1000	1.3287
				06/27/08	3700	1.027
				07/11/08	450	1.026
				07/31/08	9000	4.856
				08/08/08	520	1.164
				08/22/08	180	0.714
				09/12/08	1800	2.853
				09/20/08	560	1.215
				10/17/08	600	0.642
				10/17/08 (QA Sample)	800	N/A
				10/24/08	90	0.397
				10/24/08 (QA Sample)	180	N/A
39	Clear Creek 0.0 to 4.9	37.3885	-82.73075	05/16/08	200	1.045
				05/30/08	220	0.9205
				06/13/08	710	1.003
				06/27/08	310	0.625
				6/27/08 (QA Sample)	330	N/A
				07/11/08	330	0.692
				07/31/08	>80000	8.345
				7/31/08 (QA Sample)	31000	N/A
				08/08/08	290	0.491
				08/22/08	470	0.322
				09/12/08	1800	0.656
				09/20/08	320	0.1716
				10/17/08	280	0.484
				10/24/08	120	0.184



Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
40	Spewing Camp Branch 0.0 to 3.1	37.43039	-82.73443	05/16/08	1300	N/A
				05/30/08	<10	0.122
				06/13/08	200	0.0464
				6/13/08 (QA Sample)	300	N/A
				06/27/08	100	0.0476
				07/11/08	310	0.098
				07/31/08	52000	25.9819
				08/08/08	40	5.278
				08/22/08	90	0.065
				8/22/08 (QA Sample)	160	N/A
				09/12/08	190	0.522
				09/20/08	<10	0.065
				10/17/08	190	0.0408
				10/17/08 (QA Sample)	190	N/A
				10/24/08	10	0.038
41	Frasure Creek 0.0 to 5.2	37.4265	-82.7088	05/16/08	2000	N/A
				05/30/08	1600	0.9202
				06/13/08	170	0.3155
				06/27/08	450	0.29
				07/31/08	71000	18.8592
				08/08/08	1700	0.474
				8/8/08 (QA Sample)	360	N/A
				09/12/08	13000	0.7636
42	Frasure Creek 0.0 to 5.2	37.4556	-82.7368	05/16/08	160	N/A
				05/30/08	400	1.3342
				06/13/08	570	6.321
				06/27/08	560	0.8631
				07/31/08	43000	N/A
				08/08/08	440	0.588
				08/22/08	900	0.116
				8/22/08 (QA Sample)	1100	N/A
				09/12/08	3300	0.709
				9/12/08 (QA Sample)	3600	N/A
				09/20/08	1900	0.256
				10/17/08	3200	0.476
				10/24/08	760	0.211

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
43	Sizemore Branch 0.0 to 2.0	37.47028	-82.75408	05/16/08	800	N/A
				05/30/08	270	0.1229
				5/30/08 (QA Sample)	220	N/A
				06/13/08	300	0.1023
				06/27/08	760	0.0669
				07/31/08	9000	N/A
				08/08/08	350	0.152
				08/22/08	700	0.084
				09/12/08	1700	0.0865
				09/20/08	39000	0.154
				9/20/08 (QA Sample)	27000	N/A
				10/17/08	1200	0.2832
				10/24/08	72000	N/A
44	Simpson Branch 0.0 to 1.8	37.476	-82.74252	05/16/08	30	N/A
				05/30/08	40	0.2607
				06/13/08	100	0.9723
				07/31/08	54000	N/A
				08/08/08	210	0.058
				08/22/08	40	N/A
				09/12/08	440	0.0624
				09/20/08	160	0.077
				10/24/08	1500	0.0465
45	Left Fork Beaver Creek 18.7 to 28.6	37.3539	-82.7163	05/16/08	3900	4.395
				05/30/08	1400	21.576
				06/13/08	2500	0.138
				06/27/08	580	1.103
				07/11/08	310	0.555
				07/31/08	>80000	5.316
				08/08/08	740	0.689
				08/22/08	600	0.508
				09/12/08	30000	0.520
				09/20/08	2000	0.158
				10/17/08	6800	0.958
				10/24/08	860	0.433
				10/24/08 (QA Sample)	390	N/A

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
46	Left Fork Beaver Creek 18.7 to 28.6	37.38095	82.73524	05/16/08	800	8.799
				05/30/08	290	72.576
				06/13/08	130	5.353
				06/27/08	90	2.727
				07/11/08	130	3.555
				07/31/08	>80000	23.673
				7/31/08 (QA Sample)	17000	N/A
				08/08/08	170	4.089
				08/22/08	30	1.406
				09/12/08	1100	3.633
				09/20/08	30	1.2618
				9/20/08 (QA Sample)	50	N/A
				10/17/08	90	2.10
				10/24/08	130	1.057
47	Left Fork Beaver Creek 13.55 to 18.7	37.42999	-82.73404	05/16/08	90	N/A
				05/30/08	300	7.0056
				06/13/08	40	4.5576
				06/27/08	40	2.8755
				07/11/08	10	4.733
				07/31/08	7500	26.059
				08/08/08	210	0.032
				8/8/08 (QA Sample)	250	N/A
				08/22/08	100	2.025
				09/12/08	230	6.1594
				09/20/08	30	3.2045
				10/17/08	130	2.695
				10/24/08	110	1.4958
48	Left Fork Beaver Creek 11.4 to 13.55	37.4478	-82.7384	05/16/08	130	N/A
				05/30/08	100	9.071
				06/13/08	80	7.686
				06/27/08	250	4.4441
				07/31/08	69000	N/A
				08/08/08	250	6.695
				08/22/08	100	1.373
				09/12/08	2100	114.166
				09/20/08	110	2.553
				10/17/08	50	2.8575
				10/24/08	190	1.4364

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
49	Left Fork Beaver Creek 0.0 to 11.4	37.5064	-82.7555	05/16/08	170	N/A
				05/30/08	30	11.975
				5/30/08 (QA Sample)	20	N/A
				06/13/08	60	7.4685
				06/27/08	110	7.915
				07/31/08	53000	37.108
				08/08/08	70	8.333
				08/22/08	<10	1.803
				09/12/08	380	N/A
				9/12/08 (QA Sample)	240	N/A
				09/20/08	130	1.8648
				10/17/08	100	3.999
				10/24/08	170	3.356
50	Left Fork Beaver Creek 0.0 to 11.4	37.5564	-82.7497	05/16/08	390	N/A
				05/30/08	600	N/A
				06/13/08	220	N/A
				6/13/08 (QA Sample)	190	N/A
				06/27/08	70	N/A
				07/11/08	390	12.956
				07/31/08	27000	N/A
				08/08/08	220	5.708
				08/22/08	240	0.0144
				09/12/08	16000	22.148
				09/20/08	170	3.596
				10/17/08	180	3.155
				10/24/08	10	3.413
51	Spurlock Creek 0.0 to 0.6	37.5308	-82.7422	05/16/08	500	24.131
				05/30/08	4100	15.727
				06/13/08	410	11.539
				06/27/08	360	7.051
				07/11/08	600	N/A
				07/31/08	49000	46.941
				7/31/08 (QA Sample)	46000	46.941
				08/08/08	400	5.676
				08/22/08	450	1.677
				09/12/08	1400	20.251
				09/20/08	1100	3.884
				10/17/08	600	3.514
				10/24/08	10	2.294

Site	Segment	Latitude	Longitude	Date	<u>E. coli</u> (colonies/ 100ml)	Flow (cfs)
52	Spurlock Creek 0.6 to 4.0	37.52725	-82.73617	05/16/08	10	2.113
				05/30/08	110	0.498
				06/13/08	30	0.538
				06/27/08	20	0.721
				07/11/08	110	0.832
				07/31/08	>80000	13.349
				08/08/08	60	0.1285
				8/8/08 (QA Sample)	40	N/A
				08/22/08	<10	0.072
				09/12/08	70	0.801
				09/20/08	20	0.601
				10/17/08	30	0.633
				10/24/08	<10	0.505

**Appendix C. Discharge Monitoring Report Data**

EASTERN STP	KY0107051	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09	266	1300
30-Nov-09	606	2420
31-Oct-09	19	89
30-Sep-09	17	61
31-Aug-09	1	2
31-Jul-09	237	1414
30-Jun-09	1	1
31-May-09	289	418
30-Apr-09	57	150
31-Mar-09	358	1400
28-Feb-09	15	30
31-Jan-09	22	50
31-Dec-08	13	20
30-Nov-08	C = NO DISCHARGE	
31-Oct-08		
30-Sep-08		
31-Aug-08	C = NO DISCHARGE	
31-Jul-08	C = NO DISCHARGE	
30-Jun-08	C = NO DISCHARGE	

KNOTT CO WATER & SEWER DIST	KY0042854	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09	6	131
31-Oct-09	106	2048
30-Sep-09	269	2420
31-Aug-09	26	131
31-Jul-09	34	117
30-Jun-09	88	120
31-May-09	26	119
30-Apr-09	78	261
31-Mar-09	5	109
28-Feb-09	7	66
31-Jan-09	320	> 2420
31-Dec-08	83	409
30-Nov-08	37	117
31-Oct-08	23	82
30-Sep-08	6	63
31-Aug-08	7	173



KNOTT CO WATER & SEWER DIST	KY0042854	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jul-08	5	79
30-Jun-08	16	101
31-May-08	3	26
30-Apr-08	58	2420
31-Mar-08	129	> 2420
29-Feb-08	10	166
31-Jan-08	12	34
31-Dec-07	4	10
30-Nov-07	21	488
31-Oct-07	41	> 2420
30-Sep-07	11	281
31-Aug-07	4	25
fecal coliform reporting begins here		
31-Jul-07	40	5000
30-Jun-07	BMDL	BMDL
31-May-07	19	65
30-Apr-07	12	20
31-Mar-07	BMDL	BMDL
2/29/2007	<10	<10
31-Jan-07	<10	<10

MARTIN STP	KY0026921	Fecal Coliform (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09	BMDL	BMDL
31-Oct-09	BMDL	BMDL
30-Sep-09	22	109
31-Aug-09	BMDL	BMDL
31-Jul-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-May-09		
30-Apr-09	BMDL	BMDL
31-Mar-09	13	30
28-Feb-09	14	30
31-Jan-09	53	92
31-Dec-08	10	10
30-Nov-08	BMDL	BMDL
31-Oct-08	BMDL	BMDL
30-Sep-08	18	99
31-Aug-08	11	15
31-Jul-08	BMDL	BMDL
30-Jun-08	49.51	1214

MARTIN STP	KY0026921	Fecal Coliform (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-May-08	47	79
30-Apr-08	73	1746
31-Mar-08	30	270
29-Feb-08	23	590
31-Jan-08	19	129
31-Dec-07	40	158
30-Nov-07	665	2828
31-Oct-07	1863	20976
30-Sep-07	BMDL	BMDL
31-Aug-07	247	150000
31-Jul-07	BMDL	BMDL
30-Jun-07		
31-May-07		
30-Apr-07	11000	11000
31-Mar-07	28	624
28-Feb-07		
31-Jan-07	< 10	< 10

WAYLAND STP	KY0105228	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09		
31-Aug-09		
31-Jul-09	7	2420
30-Jun-09		
31-May-09	< 1	< 1
30-Apr-09	3	10
31-Mar-09	< 10	< 10
28-Feb-09	1122	66000
31-Jan-09	19	270
31-Dec-08	10	10
fecal coliform reporting begins here		
30-Nov-08	<10	<10
31-Oct-08	10	10
30-Sep-08	15	50
31-Aug-08	10	10
31-Jul-08	<10	<10
30-Jun-08	10	10
31-May-08	10	10

WAYLAND STP	KY0105228	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
30-Apr-08	<10	<10
31-Mar-08	54	600
28-Feb-08	36	600
31-Jan-08	<51	<600
31-Dec-07	BMDL	BMDL
30-Nov-07	BMDL	BMDL
31-Oct-07	BMDL	BMDL
30-Sep-07	24	350
31-Aug-07	BMDL	BMDL
31-Jul-07	BMDL	BMDL
30-Jun-07	10	10
31-May-07	BMDL	BMDL
30-Apr-07	BMDL	BMDL
31-Mar-07	BMDL	BMDL
28-Feb-07	<10	<10
31-Jan-07	<10	<10

WHEELWRIGHT STP	KY0028789	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09	15	31
30-Nov-09	14	23
31-Oct-09	3	5
30-Sep-09	8	20
31-Aug-09	25	119
31-Jul-09	7	25
30-Jun-09	3	11
31-May-09	4	12
30-Apr-09	7	< 10
31-Mar-09	< 10	< 10
28-Feb-09	< 10	< 10
31-Jan-09	10	10
31-Dec-08	68	
30-Nov-08	10	10
31-Oct-08	38	120
30-Sep-08	84	260
31-Aug-08	18	40
31-Jul-08	54	170
30-Jun-08	40	120
31-May-08	53	130
30-Apr-08	10	10
31-Mar-08	< 10	< 10
29-Feb-08	68	300

WHEELWRIGHT STP	KY0028789	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-08	< 10	< 10
31-Dec-07	18	30
30-Nov-07	15	30
31-Oct-07	16	40
30-Sep-07	195	710
31-Aug-07	14	30
31-Jul-07	388	1900
fecal coliform reporting begins here		
30-Jun-07	41	160
31-May-07	32	360
30-Apr-07	66	600
31-Mar-07	10	10
2/29/2007	10	10
31-Jan-07	14	60

ALLEN CENTRAL HIGH SCHOOL	KY0079430	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09	10	10
30-Jun-09	163	276
31-Mar-09	3	3
31-Dec-08	20	20
30-Sep-08	23	548
30-Jun-08	101	< 2420
31-Mar-08	39	39
31-Dec-07	22	22
30-Sep-07	28	2420
30-Jun-07	85	2420
31-Mar-07		

BEAVER CREEK ELEM SCHOOL	KY0077542	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09	BMDL	BMDL
30-Sep-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-Mar-09	BMDL	BMDL
31-Dec-08	BMDL	BMDL
30-Sep-08	BMDL	BMDL
30-Jun-08	BMDL	BMDL
31-Mar-08	1	1

BEAVER CREEK ELEM SCHOOL	KY0077542	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-07	BMDL	BMDL
30-Sep-07	BMDL	BMDL
30-Jun-07	6	6

JAMES A DUFF ELEM SCHOOL	KY0093017	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09	39	39
30-Jun-09	2	2
31-Mar-09	1	1
31-Dec-08	6	6
30-Sep-08	12	12
30-Jun-08	22	22
31-Mar-08	36	36
31-Dec-07	14	14
30-Sep-07	49	49
30-Jun-07	1	1
31-Mar-07		

JONES FORK ELEM SCHOOL	KY0087076	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09	BMDL	BMDL
30-Sep-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-Mar-09	BMDL	BMDL
31-Dec-08	BMDL	BMDL
30-Sep-08	BMDL	BMDL
30-Jun-08	BMDL	BMDL
31-Mar-08	BMDL	BMDL
31-Dec-07	9	9
30-Sep-07	150	150
30-Jun-07	4	4

MAY VALLEY ELEM SCHOOL	KY0106755	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09	24	24
30-Jun-09	21	146

MAY VALLEY ELEM SCHOOL	KY0106755	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Mar-09	2	2
31-Dec-08	21	21
30-Sep-08	BMDL	BMDL
30-Jun-08	75	1120
31-Mar-08	12	12
31-Dec-07	117	> 2420
30-Sep-07	4	4
30-Jun-07	84	84
31-Mar-07		

MCDOWELL ELEM SCHOOL	KY0079421	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	BMDL	BMDL
31-Aug-09	88	88
31-Jul-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-May-09	BMDL	BMDL
30-Apr-09	BMDL	BMDL
31-Mar-09	BMDL	BMDL
28-Feb-09	BMDL	BMDL
31-Jan-09	BMDL	BMDL
31-Dec-08	23	23
30-Nov-08	BMDL	BMDL
31-Oct-08	11	11
30-Sep-08	5	5
31-Aug-08	BMDL	BMDL
31-Jul-08	BMDL	BMDL
30-Jun-08	35	35
31-May-08	BMDL	BMDL
30-Apr-08	2	2
31-Mar-08	BMDL	BMDL
29-Feb-08	1	1
31-Jan-08	BMDL	BMDL
31-Dec-07	BMDL	BMDL
30-Nov-07	10	10
31-Oct-07	3	3
30-Sep-07	BMDL	BMDL
31-Aug-07	114	326



MCDOWELL ELEM SCHOOL	KY0079421	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jul-07	23	23
30-Jun-07	1	1
31-May-07	BMDL	BMDL
30-Apr-07	BMDL	BMDL
31-Mar-07	BMDL	BMDL

OSBORNE ELEM SCHOOL	KY0089435	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09	1	1
30-Jun-09	2	2
31-Mar-09	15	15
31-Dec-08	2	2
30-Sep-08	3	3
30-Jun-08	BMDL	BMDL
31-Mar-08	1	1
31-Dec-07	1	1
30-Sep-07	33	33
30-Jun-07	20	20
31-Mar-07		

SOUTH FLOYD HIGH SCHOOL	KY0093912	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	BMDL	BMDL
31-Aug-09	3	3
31-Jul-09	BMDL	BMDL
30-Jun-09	BMDL	BMDL
31-May-09	BMDL	BMDL
30-Apr-09	3	3
31-Mar-09	19	372
28-Feb-09	5	5
31-Jan-09	35	201
31-Dec-08	387	2420
30-Nov-08	14	195
31-Oct-08	1	1
30-Sep-08	24	24
31-Aug-08	15	15

SOUTH FLOYD HIGH SCHOOL	KY0093912	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jul-08	6	6
30-Jun-08	BMDL	BMDL
31-May-08	12	12
30-Apr-08	358	2420
31-Mar-08	49	< 2420
29-Feb-08	49	> 2420
31-Jan-08	103	154
31-Dec-07	74	74
30-Nov-07	51	516
31-Oct-07	18	18
30-Sep-07	18	18
31-Aug-07	6	6
31-Jul-07	12	12
30-Jun-07	1	1
31-May-07	BMDL	BMDL
30-Apr-07	98	> 2420
31-Mar-07	120	> 2420

S & V MHP	KY0103233	<u>E. coli</u> (colonies/100ml)
Quarter	Average Concentration	Maximum Concentration
Oct-Dec 09	BMDL	BMDL
Jul -Sept 09	BMDL	BMDL
Apr-Jun 09	BMDL	BMDL
Jan-Mar 09	49	> 2420
Oct-Dec 08	214	214
Jul-Sept 08	99	99
Apr-Jun 08	4	4
Jan- Mar 08	BMDL	BMDL
Oct-Dec 07	1	1
Jul-Sept 07	2	2
fecal coliform reporting begins here		
Apr-Jun 07	BMDL	BMDL
Jan-Mar 07	BMDL	BMDL

LEFT BEAVER CREEK TOWNHOUSES	KY0096342	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	3	3
31-Aug-09	50	50

LEFT BEAVER CREEK TOWNHOUSES	KY0096342	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jul-09	20	20
30-Jun-09	534	2420
31-May-09	49	49
30-Apr-09	27	27
31-Mar-09	194	1986
28-Feb-09	BMDL	BMDL
31-Jan-09	115	115
31-Dec-08	1414	1414
30-Nov-08	30	727
31-Oct-08	18	18
30-Sep-08	31	31
31-Aug-08	12	12
31-Jul-08	190	387
30-Jun-08	BMDL	BMDL
31-May-08	332.5	649
30-Apr-08	20	20
31-Mar-08	127	127
29-Feb-08	113	113
31-Jan-08	43	43
31-Dec-07	35	35
30-Nov-07	19	19
31-Oct-07	36	36
30-Sep-07	31	31
31-Aug-07	62	150
31-Jul-07	674	830
30-Jun-07	561	575
31-May-07	54	54
30-Apr-07	108	613
31-Mar-07	17	17
28-Feb-07	300	579
fecal coliform reporting begins here		
Jan-07	59	59

WARCO HOUSING PROJECT	KY0072974	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	BMDL	BMDL
31-Aug-09	BMDL	BMDL
31-Jul-09	3	3
30-Jun-09	2	2

WARCO HOUSING PROJECT	KY0072974	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-May-09	1	1
30-Apr-09	BMDL	BMDL
31-Mar-09	BMDL	BMDL
28-Feb-09	BMDL	BMDL
31-Jan-09	17	17
31-Dec-08	15	15
30-Nov-08	19	378
31-Oct-08	41	41
30-Sep-08	17	17
31-Aug-08	96	96
31-Jul-08	75	921
30-Jun-08	1218.5	> 2420
31-May-08	108	108
30-Apr-08	93	185
31-Mar-08	4	4
29-Feb-08	579	579
31-Jan-08	179	179
31-Dec-07	BMDL	BMDL
30-Nov-07	29	29
31-Oct-07	1	1
30-Sep-07	3	3
31-Aug-07	BMDL	BMDL
31-Jul-07	BMDL	BMDL
30-Jun-07	1	1
31-May-07	5	5
30-Apr-07	1	1
31-Mar-07	BMDL	BMDL
28-Feb-07	BMDL	BMDL
31-Jan-07	BMDL	BMDL

MCDOWELL APPALACHIAN REG HOSP	KY0085791	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	56.7	56.7
31-Aug-09	68.3	68.3
31-Jul-09	<25	<25
30-Jun-09	51.7	51.7
31-May-09	90	90
30-Apr-09	< 18	< 18
31-Mar-09	96.7	96.7

MCDOWELL APPALACHIAN REG HOSP	KY0085791	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
28-Feb-09	40	40
31-Jan-09	82.2	82.2
31-Dec-08	57.1	57.1
30-Nov-08	28.3	28.3
31-Oct-08	41.3	41.3
30-Sep-08	< 8.1	< 8.1
31-Aug-08	< 26.3	< 26.3
31-Jul-08	77.8	77.8
30-Jun-08	34.9	34.9
31-May-08	84.4	84.4
30-Apr-08	58.7	58.7
31-Mar-08	92.2	92.2
29-Feb-08	117.8	117.8
31-Jan-08	50.8	50.8
31-Dec-07	117.8	117.8
30-Nov-07	105.6	105.6
31-Oct-07	83.3	83.3
30-Sep-07	101.6	101.6
31-Aug-07	65.1	65.1
31-Jul-07	120.6	120.6
30-Jun-07	144.4	144.4
31-May-07	44.4	44.4
30-Apr-07	4	4
fecal coliform reporting begins here		
31-Mar-07	26	26
2/29/2007	37	37
31-Jan-07	36	36

CONSOL OF KY INC JONES FORK	KY0094510	Fecal coliform (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	no flow	
31-Aug-09	no flow	
31-Jul-09	no flow	
30-Jun-09	<10	<10
31-May-09	80	80
30-Apr-09	<10	<10
31-Mar-09	no flow	

CONSOL OF KY INC JONES FORK	KY0094510	Fecal coliform (colonies/100ml)
Month	Average Concentration	Maximum Concentration
28-Feb-09	10	10
31-Jan-09	10	10
31-Dec-08	< 10	< 10
30-Nov-08	10	10
31-Oct-08	< 10	< 10
30-Sep-08	60	60
31-Aug-08	110	110
31-Jul-08	< 10	< 10
30-Jun-08	20	20
31-May-08	20	20
30-Apr-08	10	10
31-Mar-08	20	20
29-Feb-08	< 10	< 10
31-Jan-08	30	30
31-Dec-07	20	20
30-Nov-07	10	10
31-Oct-07	10	10
30-Sep-07		
31-Aug-07		
31-Jul-07		
30-Jun-07	40	40
31-May-07	< 10	< 10
30-Apr-07	40	40
31-Mar-07	< 10	< 10
28-Feb-07	30	30
31-Jan-07	10	10

MCDOWELL DOLLAR GENERAL STORE	KY0103136	<u>E. coli</u> (colonies/100ml)
Quarter Ending	Average Concentration	Maximum Concentration
31-Dec-09		
30-Sep-09		
30-Jun-09	***	***
31-Mar-09	C = NO DISCHARGE	
31-Dec-08	C = NO DISCHARGE	
30-Sep-08	C = NO DISCHARGE	
30-Jun-08	C = NO DISCHARGE	
Jan-Mar 08	C = NO DISCHARGE	
31-Dec-07	8 = OTHER	
fecal coliform reporting begins here		
Jul-Sept 07	C = NO DISCHARGE	
Apr-Jun 07	***	***



GOLDEN YEARS REST HOME	KY0083089	<u>E. coli</u> (colonies/100ml)
Month	Average Concentration	Maximum Concentration
31-Jan-10		
31-Dec-09		
30-Nov-09		
31-Oct-09		
30-Sep-09	13	13
31-Aug-09	101	101
31-Jul-09	< 1	< 1
30-Jun-09	2	2
31-May-09	< 1	< 1
30-Apr-09	< 1	< 1
31-Mar-09	< 10	< 10
28-Feb-09	1300	1300
31-Jan-09	380	380
31-Dec-08	< 10	< 10
30-Nov-08	< 10	< 10
31-Oct-08	10	10
30-Sep-08	< 10	< 10
31-Aug-08	< 10	< 10
31-Jul-08	< 10	< 10
30-Jun-08	280	280
31-May-08	10	10
30-Apr-08	< 10	< 10
31-Mar-08	< 10	< 10
29-Feb-08	30	30
31-Jan-08	< 10	< 10
31-Dec-07	14000	14000
30-Nov-07	< 10	< 10
31-Oct-07	< 10	< 10
30-Sep-07	< 10	< 10
31-Aug-07	< 10	< 10
31-Jul-07	< 10	< 10
30-Jun-07	< 10	< 10
31-May-07	< 10	< 10
30-Apr-07	< 10	< 10
fecal coliform reporting begins here		
31-Mar-07	< 10	< 10
2/29/2007	< 10	< 10
31-Jan-07	< 10	< 10

## Appendix D. Unit Area Load Information

Table D.1 2007 Unit Area Loadings (E. coli million colonies/day/acre)

Site	5/15	5/16	5/30	6/13	6/27	7/10	7/26	8/17	8/31	9/13	9/14	9/28	10/12	11/16
13	7.1		0.5	2.3	44.6	0.8	39.6	0.6		0.3		0.1	0.0	0.9
20	0.3		1.9	1.0	11.0	0.7	30.9	0.0	0.1		0.1	0.0	0.0	0.8
22		3.8	1.0	0.5	14.9	0.6	16.4	0.4			1.8	0.5	0.5	4.4
24	19.9		2.4	43.3	299.3	0.3	2.5							
27		122.1	6.7	4.7	8.6	0.9	0.2							9.0
30		5.5	2.3	0.9	58.4	0.6		0.4					0.3	0.0
31	0.3		0.4	1.5	32.6		59.2	1.0	0.2		0.3	0.1	0.1	1.6
32	23.7		2.2	0.4	3.8	0.4	22.0	1.1			0.0	0.0	0.0	1.4
33	58.3		0.1	0.5	1.3	0.4	45.9	0.2			0.3			0.7
34	0.4		2.1	2.2	37.8	0.8	107.5	0.4			0.3	0.1	0.1	19.8
35			1.4					0.3					0.2	

Table D.2 2008 Unit Area Loadings (E. coli million colonies/day/acre)

Site	5/16	5/30	6/13	6/27	7/11	7/31	8/8	8/22	9/12	9/20	10/17	10/24
1	25.6	7.4	6.7	1.2	12.9	853.4	11.0	0.2	0.7	0.4	0.5	0.4
2	5.7	0.1	0.3	0.6	4.5	1515.5	106.7	13.3	0.1	0.0	4.1	0.0
3		0.9	3.2	0.6	6.0		0.0		1.5	0.1	0.1	1.1
4		1.6	3.5	0.6	15.4		1.0	0.3	0.3	0.7	0.3	0.1
36	239.3	1476.0			19.6		105.0	18.8	1.1	5.2	3.3	338.5
37	101.0	3036.6	26.2	4.2	55.6	1805.9	7.8	1.5	29.2	344.0	11.5	0.8
38	8.3	81.4	8.7	25.0	3.0	287.4	4.0	0.8	33.8	4.5	2.5	0.2
39	1.5	1.5	5.3	1.4	1.7	4938.0	1.1	1.1	8.7	0.4	1.0	0.2
40		0.0	0.1	0.1	0.5	21026.9	3.3	0.1	1.5	0.0	0.1	0.0
41		10.3	0.4	0.9		9375.1	5.6		69.5	2.7		
42		1.8	12.0	1.6			0.9	0.3	7.8	1.6	5.1	0.5
43		0.8	0.8	1.3			1.3	1.5	3.6	148.5	8.4	
44		0.2	1.9				0.2		0.5	0.2		1.4
45	59.7	105.3	1.2	2.2	0.6	1482.3	1.8	1.1	54.4	1.1	22.7	1.3
46	10.7	31.9	1.1	0.4	0.7	2867.2	1.1	0.1	6.1	0.1	0.3	0.2
47		2.3	0.2	0.1	0.1	211.9	0.0	0.2	1.5	0.1	0.4	0.2
48		0.9	1.1			1.6	0.1	234.6	0.3	0.1	0.3	
49		0.2	0.3	0.5		1202.1	0.4	0.0		0.1	0.2	0.3
50					2.6		0.7	0.0	185.0	0.3	0.3	0.0
51	119.6	639.1	46.9	25.2		22798.7	22.5	7.5	281.0	42.3	20.9	0.2
52	0.2	0.6	0.2	0.2	1.0	11249.6	0.1	0.0	0.6	0.1	0.2	0.1
30a	9.1	0.9	3.3	0.6	7.4		2.8	0.3	0.3	0.2	0.1	0.2

## Appendix E. TMDLs for Additional Sites

### Beaver Creek Site 3

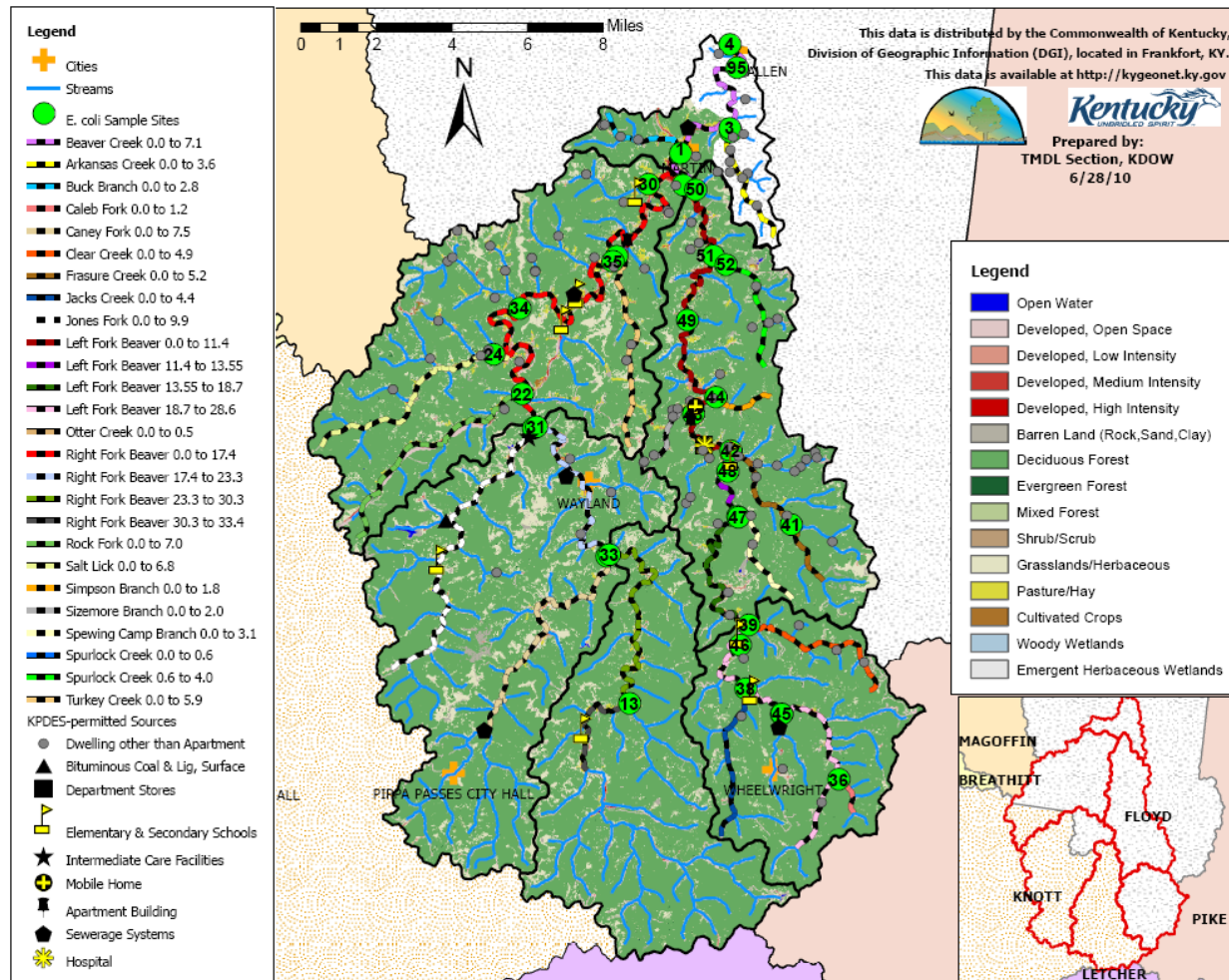


Figure E.1 Beaver Creek Site 3

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Beaver Creek at site 3 (RM 3.9) is a fifth order stream located in the Mainstem Beaver Creek Subwatershed in Floyd County (Figure E.1). Information about Beaver Creek site 3, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.1. It has a catchment of 149,202 acres (233 square miles) with an 80% forested and 6.4 % developed land cover (Table E.2). Portions of this watershed are sewered; especially in larger cities (see Figures 5.13 through 5.19). There are five stream water withdrawals in this subwatershed (Table E.3). Sampling data from site 3 is presented in Table E.4, and the TMDL allocations in Table E.5.

Table E.1 Beaver Creek RM 0.0 to 7.1 Site 3 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Beaver Creek	Beaver Creek 0.0 to 7.1	486610_01	Floyd	149201.88	233.13	5th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
3	3	3.9	37.57950	-82.73200	309.8	3.9	1.19400	2.19242	308.8016

Table E.2 Beaver Creek Site 3 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	89.18	0.14	0.06	
Developed	9530.28	14.89	6.39	1
Barren Land	1703.77	2.66	1.14	
Forest Shrubland	118935.31	182.40	79.71	
Grassland/Herbaceous	14272.84	22.30	9.57	
Pasture/ Hay	4365.16	6.82	2.93	
Cultivated Crops	284.44	0.44	0.19	
Wetlands	20.91	0.03	0.01	
Totals	149201.88	233.13	100.00	

Table E.3 Beaver Creek Site 3 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
78571	RM 2.4 of Left Fork Beaver Creek	Black Diamond Mining	0.6684028	37.53192	-82.74364
		subtraction from MAF (sum of cfs)	2.19242341		

Table E.4 Beaver Creek Site 3 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	1100	N/A	N/A	N/A
05/30/08	130	43.987	139.90	0.94
06/13/08	430	45.528	478.97	3.21
06/27/08	180	18.869	83.10	0.56
07/11/08	610	60.4	901.42	6.04
7/11/2008 (QA Sample)	550	N/A	N/A	N/A
07/31/08	4500	N/A	N/A	N/A
08/08/08	240	0.0075	0.04	0.00
09/12/08	390	23.475	223.99	1.50
09/20/08	90	9.925	21.85	0.15
10/17/08	90	9.692	21.34	0.14
10/24/08	750	9.081	166.63	1.12
Greatest Concentration	4500			

Table E.5 TMDLs for Beaver Creek Site 3

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					33997.7911	Existing Load
					<b>1813.2155</b>	<b>Total TMDL</b>
					<b>181.3216</b>	<b>MOS</b>
					1631.8940	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	95.20	% reduction
1262	KY0026921	MARTIN STP	Sewerage System	0.1856675	<b>1.0902</b>	<b>KPDES WLA</b>
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.3481265	<b>2.0441</b>	<b>KPDES WLA</b>
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
1352	KY0072974	WARCO HOUSING PROJECT	Apartment Building	0.0386807	<b>0.2271</b>	<b>KPDES WLA</b>
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.0108306	<b>0.0636</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
35252	KY0079421	MCDOWELL ELEM SCHOOL	School	0.0232084	<b>0.1363</b>	<b>KPDES WLA</b>
35254	KY0079430	ALLEN CENTRAL HIGH SCHOOL	School	0.0170195	<b>0.0999</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care Facility	0.0154723	<b>0.0908</b>	<b>KPDES WLA</b>
1134	KY0085791	MCDOWELL APPALACHIAN REG HOSP	Hospital	0.0309446	<b>0.1817</b>	<b>KPDES WLA</b>
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.0092834	<b>0.0545</b>	<b>KPDES WLA</b>
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.0105212	<b>0.0618</b>	<b>KPDES WLA</b>
35258	KY0093017	JAMES A DUFF ELEM SCHOOL	School	0.0123778	<b>0.0727</b>	<b>KPDES WLA</b>
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.0232084	<b>0.1363</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig, Surface	0.0046417	<b>0.0273</b>	<b>KPDES WLA</b>
1255	KY0096342	LEFT BEAVER CREEK TOWNHOUSES	Apartment Building	0.0278501	<b>0.1635</b>	<b>KPDES WLA</b>
1263	KY0103136	MCDOWELL DOLLAR GENERAL STORE	Department Store	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1305	KY0103233	S & V MHP	Mobile Home Site	0.0153176	<b>0.0899</b>	<b>KPDES WLA</b>
35761	KY0105228	WAYLAND STP	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
82092	KY0106755	MAY VALLEY ELEM SCHOOL	School	0.0092834	<b>0.0545</b>	<b>KPDES WLA</b>
35260	KY0107051	EASTERN STP	Sewerage System	0.0386807	<b>0.2271</b>	<b>KPDES WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1143	KYG400479	BLACKBURN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1180	KYG400520	DEROSSETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1218	KYG400567	HICKS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1367	KYG400579	WRIGHT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>



AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1196	KYG400590	GOBLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1265	KYG400612	MCKINNEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1133	KYG400642	ALLEN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4250	KYG400659	CURRENT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1270	KYG400666	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1315	KYG400677	SHREWBERRY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1162	KYG400678	CASTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1161	KYG400692	CASE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1274	KYG400714	MULLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1369	KYG400724	YOUMANS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1222	KYG400730	HOOVER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1343	KYG400778	TURNER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1158	KYG400787	CARRAWAY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1232	KYG400806	JACOBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG400854	COLLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1276	KYG400975	MULLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4327	KYG401073	MAY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4333	KYG401140	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4332	KYG401142	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
12253	KYG401218	SHEPPARD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15635	KYG401271	LAWSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15807	KYG401352	EVERIDGE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
33378	KYG401353	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74022	KYG401406	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74025	KYG401409	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74062	KYG401442	MULLINS II RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG401516	COLLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
43224	KYG401548	PRATER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45073	KYG401582	DINGUS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
45396	KYG401587	GEARHEART RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45070	KYG401590	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
46144	KYG401601	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
47022	KYG401638	LAFERTY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48864	KYG401645	DUFF RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
54879	KYG401772	NICHOLAS ISON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
75141	KYG401851	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
75746	KYG401868	ROWE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
81570	KYG401981	SCARBERRY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
84292	KYG402025	COOK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
97291	KYG402063	PRATER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>7.0109</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	1.1939966	1624.8831	remainder
					<b>16.2488</b>	<b>Future Growth WLA</b>
					<b>23.2597</b>	<b>Total WLA</b>
					<b>1608.6343</b>	<b>LA</b>

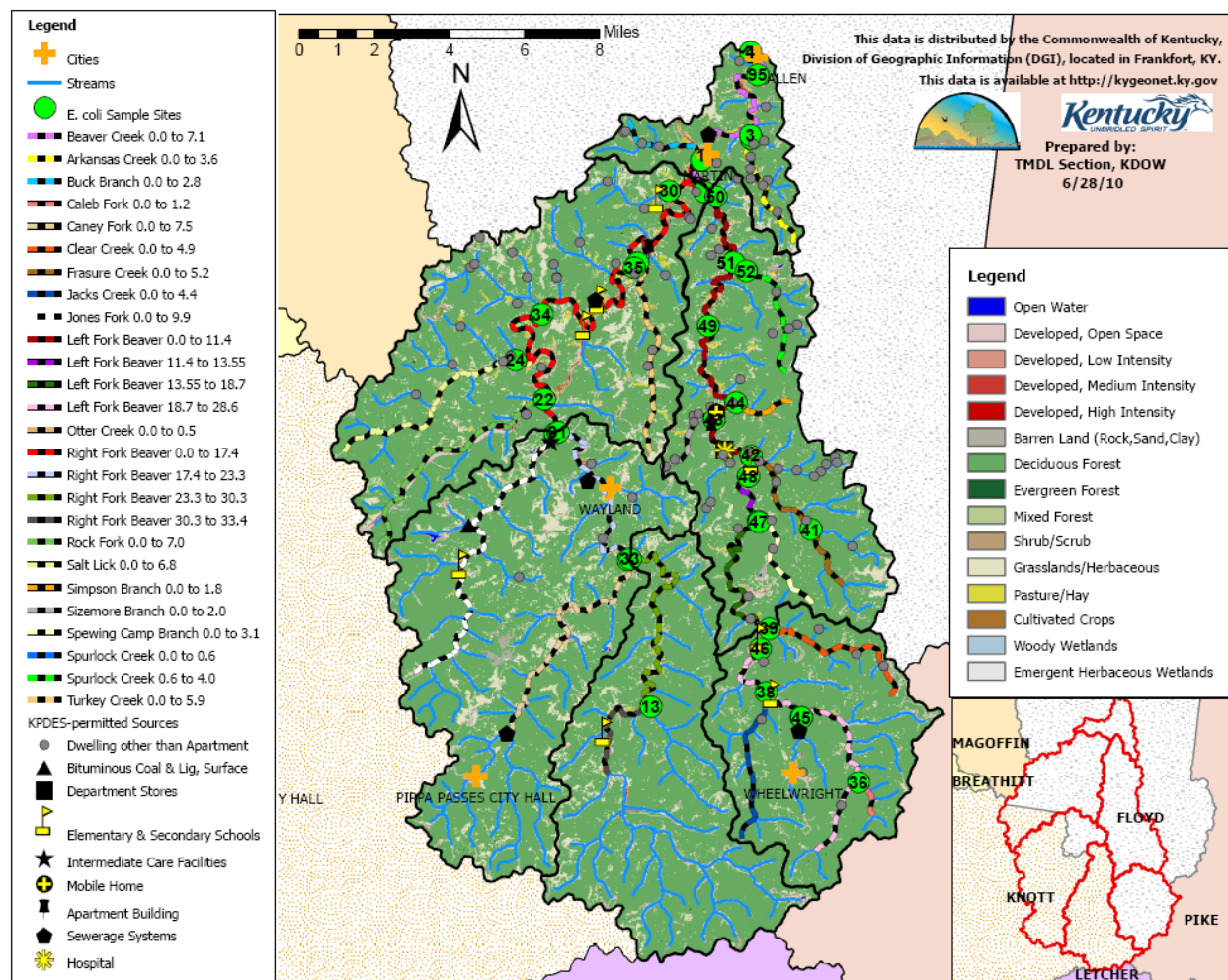
**Beaver Creek Site PRI095**

Figure E.2 Beaver Creek Site PRI095

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Beaver Creek at site PRI095 (RM 1.1) is a fifth order stream located in the Mainstem Beaver Creek Subwatershed in Floyd County (Figure E.2). Information about Beaver Creek site PRI095, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.6. It has a catchment of 153,028 acres (239 square miles) with a 78% forested and 6.4 % developed land cover (Table E.7). Portions of this watershed are sewered; especially in larger cities (see Figures 5.13 through 5.19). There are five stream water withdrawals in this subwatershed (Table E.8). Sampling data from site PRI095 is presented in Table E.9, and the TMDL allocations in Table E.10.



Table E.6 Beaver Creek Site PRI095 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order				
Beaver Creek	Beaver Creek 0.0 to 7.1	486610_01	Floyd	153027.59	239.11	5th order				
Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)	
PRI095	95	1.1	37.6028	-82.7275	317	1.1	1.201	2.1924	316.009	

Table E.7 Beaver Creek Site PRI095 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	89.17	0.14	0.06	
Developed	9848.83	15.39	6.44	1.0
Barren Land	1722.86	2.69	1.13	
Forest/Shrubland	119419.22	186.59	78.04	
Grassland/Herbaceous	14689.87	22.95	9.60	
Pasture/Hay	4586.87	7.17	3.00	
Cultivated Crops	304.41	0.48	0.20	
Wetlands	22.01	0.03	0.01	
Totals	153027.60	239.11	100.00	

Table E.8 Beaver Creek Site PRI095 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal, cfs	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
78571	RM 2.4 of Left Fork Beaver Creek	Black Diamond Mining	0.6684028	37.53192	-82.74364
		subtraction from MAF (sum of cfs)	2.19242341		

Table E.9 Beaver Creek Site PRI095 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
5/17/07	2700	N/A	N/A	N/A
6/14/07	656	N/A	N/A	N/A
7/19/07	426	N/A	N/A	N/A
8/14/07	500	N/A	N/A	N/A
9/20/07	268	N/A	N/A	N/A
10/18/07	261	N/A	N/A	N/A
5/21/08	450	N/A	N/A	N/A
6/17/08	19000	N/A	N/A	N/A
7/16/08	220	N/A	N/A	N/A
10/15/08	240	N/A	N/A	N/A
<b>Greatest Concentration</b>	<b>19000</b>			

Table E.10 TMDLs for Beaver Creek Site PRI095

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					146896.3813	Existing Load
					<b>1855.5332</b>	<b>Total TMDL</b>
					<b>185.5533</b>	<b>MOS</b>
					1669.9799	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	98.86	% reduction
1262	KY0026921	MARTIN STP	Sewerage System	0.1856675	<b>1.0902</b>	<b>KPDES WLA</b>
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.3481265	<b>2.0441</b>	<b>KPDES WLA</b>
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
1352	KY0072974	WARCO HOUSING PROJECT	Apartment Building	0.0386807	<b>0.2271</b>	<b>KPDES WLA</b>
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.0108306	<b>0.0636</b>	<b>KPDES WLA</b>
35252	KY0079421	MCDOWELL ELEM SCHOOL	School	0.0232084	<b>0.1363</b>	<b>KPDES WLA</b>
35254	KY0079430	ALLEN CENTRAL HIGH SCHOOL	School	0.0170195	<b>0.0999</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care Facility	0.0154723	<b>0.0908</b>	<b>KPDES WLA</b>
1134	KY0085791	MCDOWELL APPALACHIAN REG HOSP	Hospital	0.0309446	<b>0.1817</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.0092834	<b>0.0545</b>	<b>KPDES WLA</b>
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.0105212	<b>0.0618</b>	<b>KPDES WLA</b>
35258	KY0093017	JAMES A DUFF ELEM SCHOOL	School	0.0123778	<b>0.0727</b>	<b>KPDES WLA</b>
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.023208438	<b>0.1363</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig. Surface	0.0046417	<b>0.0273</b>	<b>KPDES WLA</b>
1255	KY0096342	LEFT BEAVER CREEK TOWNHOUSES	Apartment Building	0.0278501	<b>0.1635</b>	<b>KPDES WLA</b>
1263	KY0103136	MCDOWELL DOLLAR GENERAL STORE	Department Store	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1305	KY0103233	S & V MHP	Mobile Home Site	0.0153176	<b>0.0899</b>	<b>KPDES WLA</b>
35761	KY0105228	WAYLAND STP	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
82092	KY0106755	MAY VALLEY ELEM SCHOOL	School	0.0092834	<b>0.0545</b>	<b>KPDES WLA</b>
35260	KY0107051	EASTERN STP	Sewerage System	0.038680729	<b>0.2271</b>	<b>KPDES WLA</b>
1304	KYG400339	ROWE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1143	KYG400479	BLACKBURN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1180	KYG400520	DEROSSETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1218	KYG400567	HICKS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1367	KYG400579	WRIGHT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1196	KYG400590	GOBLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1248	KYG400593	LAWSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1265	KYG400612	MCKINNEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1133	KYG400642	ALLEN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4250	KYG400659	CURRENT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1270	KYG400666	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1315	KYG400677	SHREWBERRY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1162	KYG400678	CASTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1161	KYG400692	CASE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1274	KYG400714	MULLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1369	KYG400724	YOUMANS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1222	KYG400730	HOOVER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1343	KYG400778	TURNER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1158	KYG400787	CARRAWAY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1232	KYG400806	JACOBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG400854	COLLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1328	KYG400936	STURGILL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1276	KYG400975	MULLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4327	KYG401073	MAY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4342	KYG401126	ROSE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4333	KYG401140	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4332	KYG401142	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
4331	KYG401143	COOLEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
12253	KYG401218	SHEPPARD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15635	KYG401271	LAWSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15807	KYG401352	EVERIDGE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
33378	KYG401353	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74022	KYG401406	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74025	KYG401409	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74062	KYG401442	MULLINS II RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG401516	COLLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
35892	KYG401529	KEATHLEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
43224	KYG401548	PRATER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>



AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45073	KYG401582	DINGUS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45396	KYG401587	GEARHEART RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45070	KYG401590	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
46144	KYG401601	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
47022	KYG401638	LAFERTY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48864	KYG401645	DUFF RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
53921	KYG401764	MCKINNEY JR RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
54879	KYG401772	ISON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
75141	KYG401851	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
75746	KYG401868	ROWE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
76185	KYG401883	ALLEN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
79842	KYG401936	BENTLEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
81570	KYG401981	SCARBERRY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
84292	KYG402025	COOK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
97291	KYG402063	PRATER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>7.0518</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	1.2009592	1662.9281	remainder
					<b>16.6293</b>	<b>Future Growth WLA</b>
					<b>23.6811</b>	<b>Total WLA</b>
					<b>1646.2989</b>	<b>LA</b>

## Beaver Creek Site 4

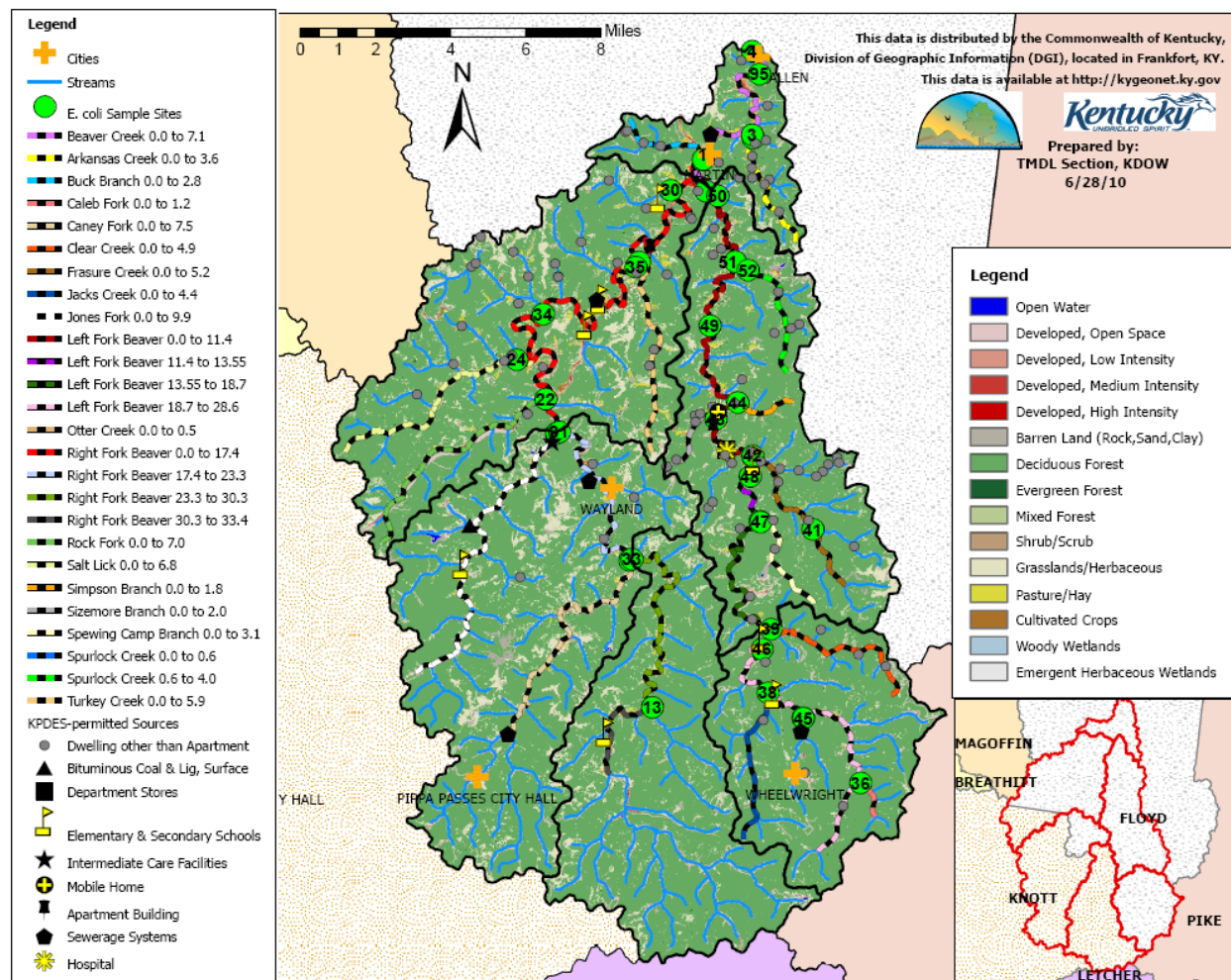


Figure E.3 Beaver Creek Site 4

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 2 is under site 3, site 30a is to the immediate left of site 50, site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Beaver Creek at site 4 (RM 0.2) is a fifth order stream located in the Mainstem Beaver Creek Subwatershed in Floyd County (Figure E.3). Information about Beaver Creek site 4, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.11. It has a catchment of 153,670 acres (240 square miles) with an 80% forested and 6.5 % developed land cover (Table E.12). Portions of this watershed are seweraged; especially in larger cities (see Figures 5.13 through 5.19). There are five stream water withdrawals in this subwatershed (Table E.13). Sampling data from site PRI095 is presented in Table E.14, and the TMDL allocations in Table E.15.

Table E.11 Beaver Creek Site 4 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Beaver Creek	Beaver Creek 0.0 to 7.1	486610_01	Floyd	153669.8	240.11	5th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
4	4	0.2	37.6118	-82.7307	317.8	0	1.2025	2.1924	316.810

Table E.12 Beaver Creek Site 4 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	89.41	0.14	0.06	
Developed	9935.56	15.52	6.47	1.0
Barren Land	1724.06	2.69	1.12	
Forest/Shrubland	122227.36	190.98	79.54	
Grassland/ Herbaceous	14736.76	23.03	9.59	
Pasture/Hay	4628.17	7.23	3.01	
Cultivated Crops	305.80	0.48	0.20	
Wetlands	22.68	0.04	0.01	
Totals	153669.77	240.11	100.00	

Table E.13 Beaver Creek Site 4 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
78571	RM 2.4 of Left Fork Beaver Creek	Black Diamond Mining	0.6684028	37.53192	-82.74364
		subtraction from MAF	2.19242341		

Table E.14 Beaver Creek Site 4 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	300	N/A	N/A	N/A
05/30/08	290	33.798	239.80	1.56
06/13/08	630	34.654	534.14	3.48
06/27/08	180	22.534	99.24	0.65
07/11/08	1500	64.465	2365.78	15.40
07/31/08	1900	N/A	N/A	N/A
08/08/08	270	23.691	156.50	1.02
08/22/08	250	6.8769	42.06	0.27
09/12/08	90	18.639	41.04	0.27
09/20/08	380	11.850	110.17	0.72
9/20/08 (QA Sample)	190	N/A	N/A	N/A
10/17/08	210	8.251	42.39	0.28
10/24/08	70	11.35	19.44	0.13
10/24/08 (QA Sample)	70	N/A	N/A	N/A
Greatest Concentration	1900			

Table E.15 TMDLs for Beaver Creek Site 4

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					14726.8980	Existing Load
					<b>1860.2397</b>	<b>Total TMDL</b>
					<b>186.0240</b>	<b>MOS</b>
					1674.2158	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	88.63	% reduction
1262	KY0026921	MARTIN STP	Sewerage System	0.18566748	<b>1.0902</b>	<b>KPDES WLA</b>
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.348126525	<b>2.0441</b>	<b>KPDES WLA</b>
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
1352	KY0072974	WARCO HOUSING PROJECT	Apartment Building	0.038680725	<b>0.2271</b>	<b>KPDES WLA</b>
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.010830603	<b>0.0636</b>	<b>KPDES WLA</b>
35252	KY0079421	MCDOWELL ELEM SCHOOL	School	0.023208435	<b>0.1363</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
35254	KY0079430	ALLEN CENTRAL HIGH SCHOOL	School	0.017019519	<b>0.0999</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care Facility	0.01547229	<b>0.0908</b>	<b>KPDES WLA</b>
1134	KY0085791	MCDOWELL APPALACHIAN REG HOSP	Hospital	0.03094458	<b>0.1817</b>	<b>KPDES WLA</b>
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.009283374	<b>0.0545</b>	<b>KPDES WLA</b>
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.010521157	<b>0.0618</b>	<b>KPDES WLA</b>
35258	KY0093017	JAMES A DUFF ELEM SCHOOL	School	0.012377832	<b>0.0727</b>	<b>KPDES WLA</b>
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.023208438	<b>0.1363</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig, Surface	0.004641686	<b>0.0273</b>	<b>KPDES WLA</b>
1255	KY0096342	LEFT BEAVER CREEK TOWNHOUSES	Apartment Building	0.027850122	<b>0.1635</b>	<b>KPDES WLA</b>
1263	KY0103136	MCDOWELL DOLLAR GENERAL STORE	Department Store	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1305	KY0103233	S & V MHP	Mobile Home Site	0.015317567	<b>0.0899</b>	<b>KPDES WLA</b>
35761	KY0105228	WAYLAND STP	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
82092	KY0106755	MAY VALLEY ELEM SCHOOL	School	0.009283375	<b>0.0545</b>	<b>KPDES WLA</b>
35260	KY0107051	EASTERN STP	Sewerage System	0.038680729	<b>0.2271</b>	<b>KPDES WLA</b>
1304	KYG400339	ROWE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1143	KYG400479	BLACKBURN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1180	KYG400520	DEROSSETT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1218	KYG400567	HICKS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1367	KYG400579	WRIGHT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>



AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1196	KYG400590	GOBLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1248	KYG400593	LAWSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1265	KYG400612	MCKINNEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1133	KYG400642	ALLEN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4250	KYG400659	CURRENT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1270	KYG400666	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1315	KYG400677	SHREWBERRY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1162	KYG400678	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1161	KYG400692	CASE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1274	KYG400714	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1369	KYG400724	YOUMANS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1222	KYG400730	HOOVER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1343	KYG400778	TURNER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1158	KYG400787	CARRAWAY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1232	KYG400806	JACOBS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG400854	COLLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1328	KYG400936	STURGILL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1276	KYG400975	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4327	KYG401073	MAY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4342	KYG401126	ROSE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4333	KYG401140	DYE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4332	KYG401142	TACKETT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4331	KYG401143	COOLEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
12253	KYG401218	SHEPPARD RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
15635	KYG401271	LAWSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
15807	KYG401352	EVERIDGE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
33378	KYG401353	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74022	KYG401406	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74025	KYG401409	STUMBO RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74062	KYG401442	MULLINS II RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG401516	COLLINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
35892	KYG401529	KEATHLEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
36057	KYG401541	MCKINNEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
43224	KYG401548	PRATER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
45073	KYG401582	DINGUS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
45396	KYG401587	GEARHEART RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
45070	KYG401590	HALL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
46144	KYG401601	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
47022	KYG401638	LAFERTY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
48864	KYG401645	DUFF RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
50138	KYG401699	JUSTICE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
53921	KYG401764	MCKINNEY JR RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
54879	KYG401772	ISON RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
75141	KYG401851	LITTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
75746	KYG401868	ROWE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
76185	KYG401883	ALLEN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
79842	KYG401936	BENTLEY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
81570	KYG401981	SCARBERRY RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
84292	KYG402025	COOK RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
97291	KYG402063	PRATER RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>7.0609</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	1.202506386	1667.1549	remainder
					<b>16.6715</b>	<b>Future Growth WLA</b>
					<b>23.7324</b>	<b>Total WLA</b>
					<b>1650.4834</b>	<b>LA</b>



### Right Fork Beaver Creek Site 30

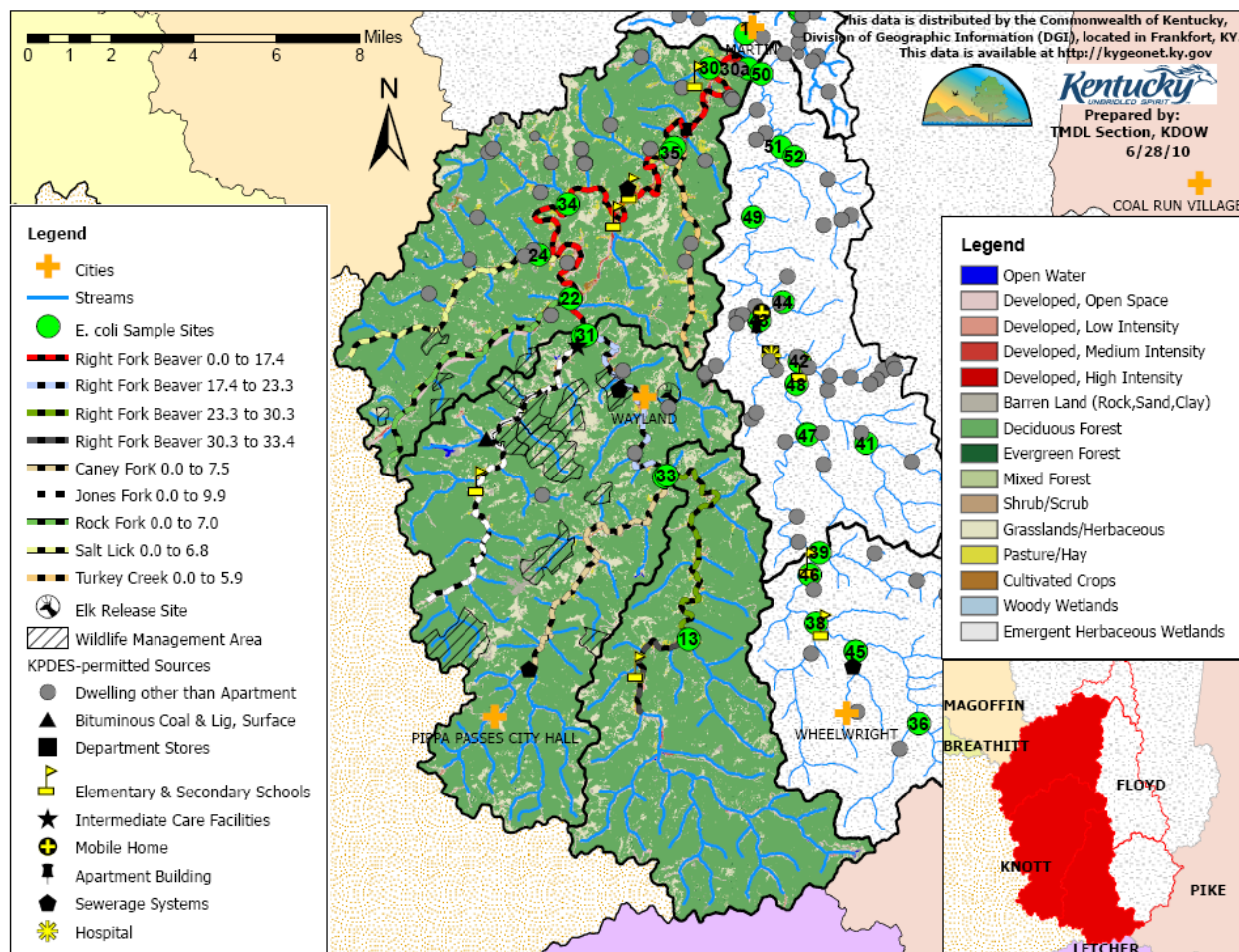


Figure E.4 Right Fork Beaver Creek Site 30

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at site 30 (RM 1.4) is a fourth order stream located in Floyd County (Figure E.4). Its watershed consists of the Upper, Middle, and the majority of the Lower Right Fork Beaver Creek subwatersheds and extends from Knott into Floyd County. Information about Right Fork Beaver Creek at site 30, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.16. It has a catchment of 98,511 acres (154 square miles) with a 79% forested and 6 % developed land cover (Table E.17). There are several wildlife management areas and an Elk release site in this subwatershed (Figure E.4). Portions of this watershed are seweraged; especially in larger cities (see Figures 5.17 and 5.18). There are three stream water withdrawals in this subwatershed (Table E.18). Sampling data from site 30 is presented in Table E.19, and the TMDL allocations in Table E.20.

Table E.16 Right Fork Beaver Creek Site 30 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Right Fork Beaver Creek	Right Fork Beaver Creek 0.0 to 17.4	501863_01	Floyd	98510.89	153.923	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
30	30	1.4	37.5591	-82.7723	204.7	1.4	0.4781	1.4312	203.747

Table E.17 Right Fork Beaver Creek Site 30 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	75.82	0.12	0.08	
Developed	5899.02	9.22	5.99	1
Barren Land	1200.14	1.88	1.22	
Forest/Shrubland	77424.52	120.98	78.59	
Grassland/Herbaceous	10740.04	16.78	10.90	
Pasture/ Hay	2991.84	4.67	3.04	
Cultivated Crops	164.91	0.26	0.17	
Wetlands	14.59	0.02	0.01	
Totals	98510.89	153.92	100.00	

Table E.18 Right Fork Beaver Creek Site 30 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal, cfs	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.410016	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.015472	37.41038	-82.78096
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF	1.431187		

Table E.19 Right Fork Beaver Creek Site 30 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/07	310	70.79	536.90	5.45
05/30/07	310	29.77	225.79	2.29
5/30/2007 (QA Sample)	490	N/A	N/A	N/A
06/13/07	180	19.27	84.86	0.86
06/27/07	3700	63.551	5752.85	58.40
07/10/07	220	11.799	63.51	0.64
07/26/07	13000	N/A	N/A	
08/17/07	210	7.202	37.00	0.38
8/17/2007 (QA Sample)	140	N/A	N/A	N/A
08/31/07	160	N/A	N/A	N/A
09/14/07	180	N/A	N/A	N/A
09/28/07	330	N/A	N/A	N/A
10/12/07	40	25.701	25.15	0.26
11/16/07 (outside PCR season)	110	0.371	1.00	0.01
Greatest Concentration	13000			

Table E.20 TMDLs for Right Fork Beaver Creek Site 30

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					64802.6938	Existing Load
					<b>1196.3574</b>	<b>Total TMDL</b>
					<b>119.6357</b>	<b>MOS</b>
					1076.7217	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	98.34	% reduction
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.154723	<b>0.9085</b>	<b>KPDES WLA</b>
1352	KY0072974	WARCO HOUSING PROJECT	Apartment Building	0.038681	<b>0.2271</b>	<b>KPDES WLA</b>
35254	KY0079430	ALLEN CENTRAL HIGH SCHOOL	School	0.01702	<b>0.0999</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care facility	0.015472	<b>0.0908</b>	<b>KPDES WLA</b>
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.009283	<b>0.0545</b>	<b>KPDES WLA</b>
35258	KY0093017	JAMES A DUFF ELEM SCHOOL	School	0.012378	<b>0.0727</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig. Surface	0.004642	<b>0.0273</b>	<b>KPDES WLA</b>
35761	KY0105228	WAYLAND STP	Sewerage System	0.154723	<b>0.9085</b>	<b>KPDES WLA</b>
82092	KY0106755	MAY VALLEY ELEM SCHOOL	School	0.009283	<b>0.0545</b>	<b>KPDES WLA</b>
35260	KY0107051	EASTERN STP	Sewerage System	0.038681	<b>0.2271</b>	<b>KPDES WLA</b>
1196	KYG400590	GOBLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1133	KYG400642	ALLEN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1270	KYG400666	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1222	KYG400730	HOOVER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1343	KYG400778	TURNER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1276	KYG400975	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
4327	KYG401073	MAY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
12253	KYG401218	SHEPPARD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15807	KYG401352	EVERIDGE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
33378	KYG401353	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
43224	KYG401548	PRATER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
54879	KYG401772	ISON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
81570	KYG401981	SCARBERRY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
84292	KYG402025	COOK RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
97291	KYG402063	PRATER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>2.8073</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.478094	1073.9144	remainder
					<b>10.7391</b>	<b>Future Growth WLA</b>
					<b>13.5464</b>	<b>Total WLA</b>
					<b>1063.1753</b>	<b>LA</b>



### Right Beaver Creek Site 30a

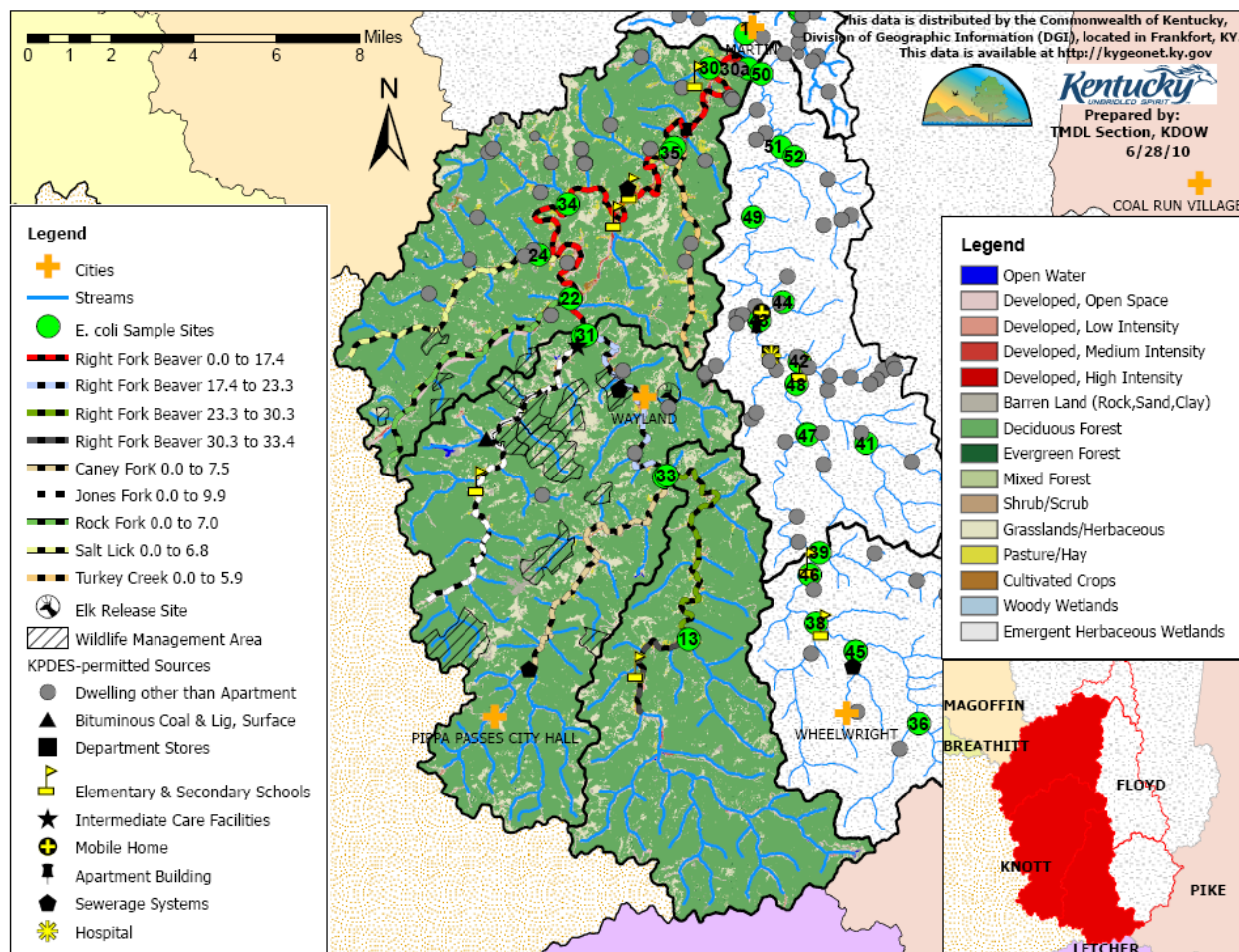


Figure E.5 Right Fork Beaver Creek Site 30a

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at site 30a (RM 0.2) is a fourth order stream located in Floyd County (Figure E.5). Its watershed consists of the Upper, Middle, and Lower Right Fork Beaver Creek subwatersheds and extends from Knott into Floyd County. Information about Right Fork Beaver Creek at site 30a, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.21. It has a catchment of 99,096 acres (155 square miles) with a 79% forested and 6 % developed land cover (Table E.22). There are several wildlife management areas and an elk release site in this subwatershed (Figure E.5). Portions of this watershed are sewered; especially in larger cities (see Figures 5.17 and 5.18). There are three stream water withdrawals in this subwatershed (Table E.23). Sampling data from site 30a is presented in Table E.24, and the TMDL allocations in Table E.25.

Table E.21 Right Fork Beaver Creek Site 30a Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Right Fork Beaver Creek	Right Fork Beaver Creek 0.0 to 17.4	501863_01	Floyd	99095.56	154.837	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
30a	30a	0.2	37.55840	-82.75550	205.9	0	0.47887	1.43119	204.9477

Table E.22 Right Fork Beaver Creek Site 30a Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	76.27	0.12	0.08	
Developed	5934.03	9.27	5.99	1.0
Barren Land	1207.26	1.89	1.22	
Forest/Shrubland	77884.04	121.69	78.59	
Grassland/ Herbaceous	10803.79	16.88	10.90	
Pasture/Hay	3009.60	4.70	3.04	
Cultivated Crops	165.89	0.26	0.17	
Wetlands	14.68	0.02	0.01	
Total	99095.56	154.84	100.00	

Table E.23 Right Fork Beaver Creek Site 30a Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal, cfs	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF	1.43118689		

Table E.24 Right Fork Beaver Creek Site 30a Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	560	65.85	902.20	9.10
05/30/08	140	26.3	90.08	0.91
06/13/08	500	26.876	328.77	3.32
06/27/08	250	10.230	62.57	0.63
07/11/08	680	44.002	732.05	7.39
07/31/08	3800	N/A	N/A	N/A
08/08/08	500	22.4328	274.42	2.77
08/22/08	150	7.995	29.34	0.30
09/12/08	110	11.121	29.93	0.30
09/20/08	120	7.015	20.60	0.21
10/17/08	50	8.743	10.70	0.11
10/24/08	90	7.326	16.13	0.16
Greatest Concentration	3800			

Table E.25 TMDLs for Right Fork Beaver Creek Site 30a

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					19053.9617	Existing Load
					<b>1203.4081</b>	<b>Total TMDL</b>
					<b>120.3408</b>	<b>MOS</b>
					1083.0673	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	94.32	% reduction
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.154723	<b>0.9085</b>	<b>KPDES WLA</b>
1352	KY0072974	WARCO HOUSING PROJECT	Apartment Building	0.038681	<b>0.2271</b>	<b>KPDES WLA</b>
35254	KY0079430	ALLEN CENTRAL HIGH SCHOOL	School	0.01702	<b>0.0999</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care Facility	0.015472	<b>0.0908</b>	<b>KPDES WLA</b>
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.009283	<b>0.0545</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
35258	KY0093017	JAMES A DUFF ELEM SCHOOL	School	0.012378	<b>0.0727</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig. Surface	0.004642	<b>0.0273</b>	<b>KPDES WLA</b>
35761	KY0105228	WAYLAND STP	Sewerage System	0.154723	<b>0.9085</b>	<b>KPDES WLA</b>
82092	KY0106755	MAY VALLEY ELEM SCHOOL	School	0.009283	<b>0.0545</b>	<b>KPDES WLA</b>
35260	KY0107051	EASTERN STP	Sewerage System	0.038681	<b>0.2271</b>	<b>KPDES WLA</b>
1196	KYG400590	GOBLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1133	KYG400642	ALLEN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1270	KYG400666	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1222	KYG400730	HOOVER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1343	KYG400778	TURNER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1276	KYG400975	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4327	KYG401073	MAY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
12253	KYG401218	SHEPPARD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15807	KYG401352	EVERIDGE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
33378	KYG401353	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
43224	KYG401548	PRATER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
47022	KYG401638	LAFERTY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
50627	KYG401721	SCOTT RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
54879	KYG401772	ISON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
81570	KYG401981	SCARBERRY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
84292	KYG402025	COOK RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
97291	KYG402063	PRATER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>2.8118</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.478867	1080.2555	remainder
					<b>10.8026</b>	<b>Future Growth WLA</b>
					<b>13.6144</b>	<b>Total WLA</b>
					<b>1069.4529</b>	<b>LA</b>



### Right Fork Beaver Creek Site 34

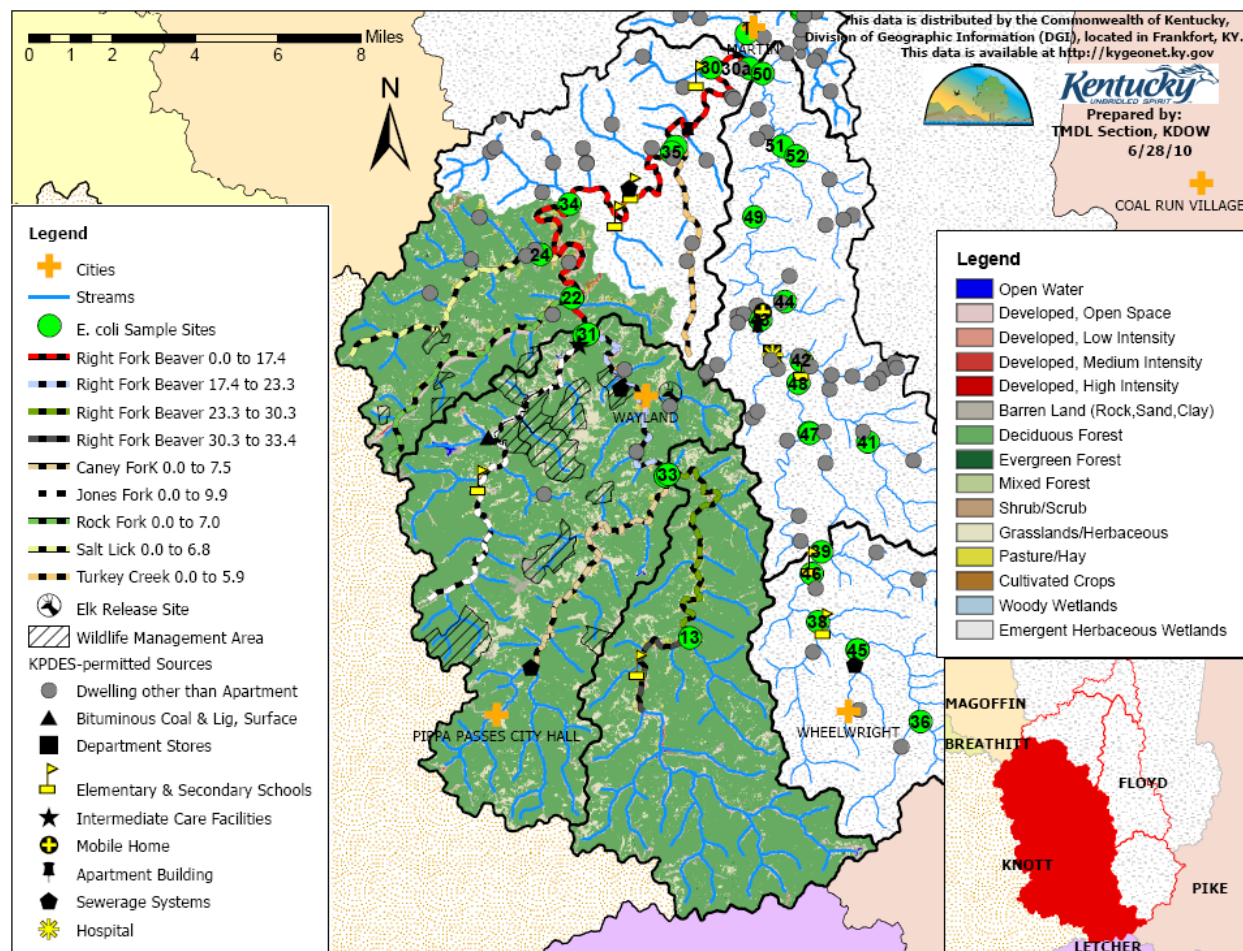


Figure E.6 Right Fork Beaver Creek Site 34

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at site 34 (RM 11.2) is a fourth order stream located in Floyd County (Figure E.6). Its watershed consists of the Upper, Middle, and part of the Lower Right Fork Beaver Creek subwatersheds and extends from Knott into Floyd County. Information about Right Fork Beaver Creek at site 34, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.26. It has a catchment of 80,698 acres (126 square miles) with an 80% forested and 5.7 % developed land cover (Table E.27). There are several wildlife management areas and an elk release site in this subwatershed (Figure E.6). Portions of this watershed are sewered; especially in larger cities (see Figures 5.17 and 5.18). There are three stream water withdrawals in this subwatershed (Table E.28). Sampling data from site 34 is presented in Table E.29, and the TMDL allocations in Table E.30.

Table E.26 Right Fork Beaver Creek Site 34 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Right Fork Beaver Creek	Right Fork Beaver Creek 0.0 to 17.4	501863_01	Floyd	80698.02	126.091	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
34	34	11.2	37.5129	-82.8362	169.3	11.2	0.35818	1.4312	168.227

Table E.27 Right Fork Beaver Creek Site 34 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	74.66	0.12	0.09	
Developed	4630.09	7.23	5.74	1
Barren Land	1105.21	1.73	1.37	
Forest/Shrubland	64664.64	101.04	80.13	
Grassland/Herbaceous	8293.16	12.96	10.28	
Pasture/ Hay	1828.19	2.86	2.27	
Cultivated Crops	92.71	0.14	0.11	
Wetlands	9.36	0.01	0.01	
Totals	80698.02	126.09	100.00	

Table E.28 Right Fork Beaver Creek Site 34 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal, cfs	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF	1.43118689		

Table E.29 Right Fork Beaver Creek Site 34 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/15/07	80	18.505	36.22	0.45
05/30/07	290	24.19	171.63	2.13
06/13/07	390	18.952	180.83	2.24
06/27/07	5900	21.113	3047.62	37.77
07/10/07	300	9.207	67.58	0.84
07/26/07	5100	69.501	8672.01	107.46
08/17/07	150	7.962	29.22	0.36
08/31/07	130	N/A	N/A	N/A
09/14/07	210	3.97	20.40	0.25
09/28/07	100	1.933	4.73	0.06
10/12/07	120	3.6554	10.73	0.13
11/17/07 (outside PCR season)	3300	19.807	1599.16	19.82
11/17/07 (QA Sample)	2100	N/A	N/A	N/A
Greatest Concentration	5900			

Table E.30 TMDLs for Right Fork Beaver Creek Site 34

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					24283.2262	Existing Load
					<b>987.7923</b>	<b>Total TMDL</b>
					<b>98.7792</b>	<b>MOS</b>
					889.0130	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	96.34	% reduction
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.0108306	<b>0.0636</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care Facility	0.0154723	<b>0.0908</b>	<b>KPDES WLA</b>
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.0092834	<b>0.0545</b>	<b>KPDES WLA</b>
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig, Surface	0.0046417	<b>0.0273</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
35761	KY0105228	WAYLAND STP	Sewerage System	0.1547229	<b>0.9085</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>2.1032</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.3581835	886.9099	remainder
					<b>8.8691</b>	<b>Future Growth WLA</b>
					<b>10.9723</b>	<b>Total WLA</b>
					<b>878.0408</b>	<b>LA</b>



### Right Fork Beaver Creek Site 35

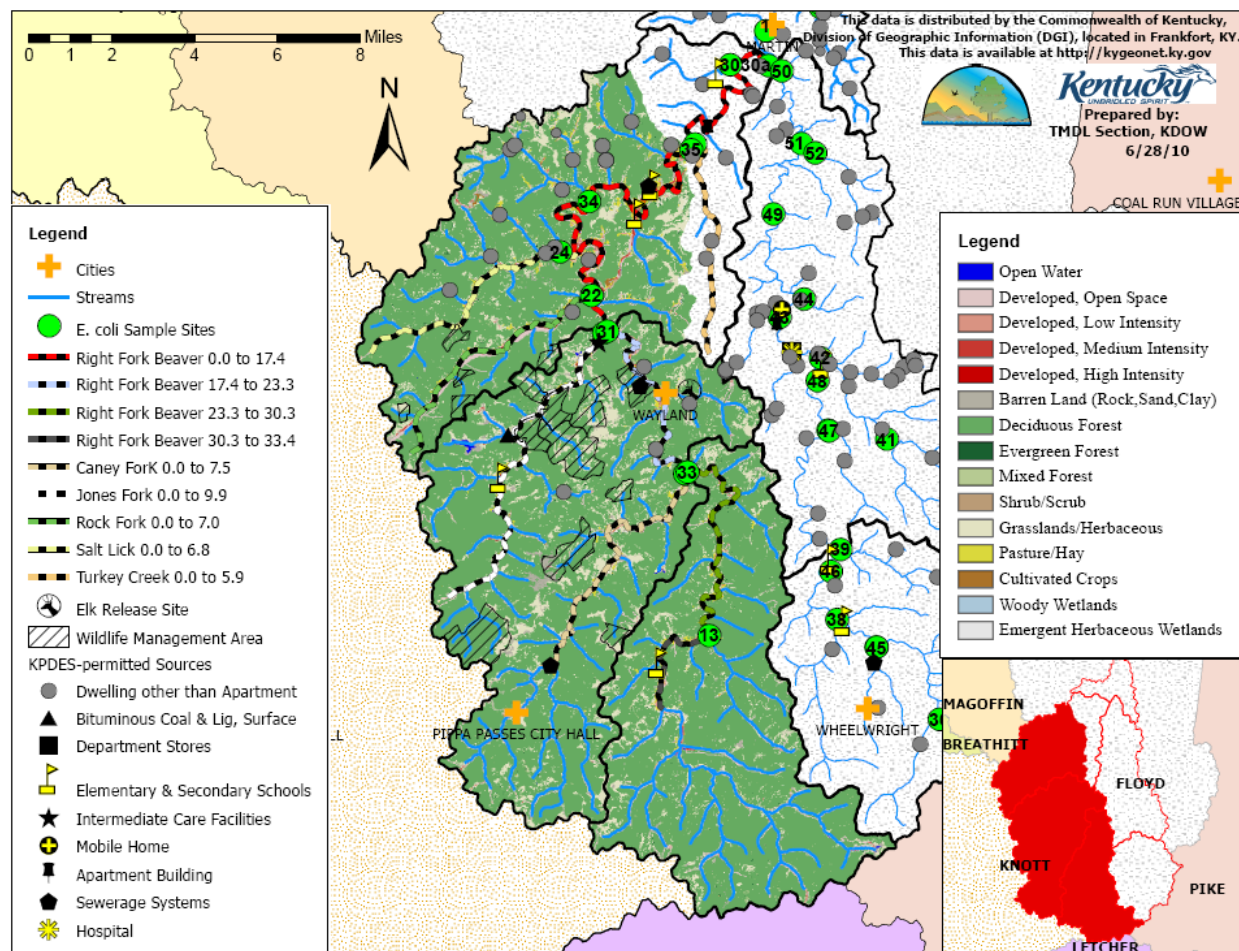


Figure E.7 Right Fork Beaver Creek Site 35

Note: Due to map resolution, some sites are masked by symbols for other sites. 27 is under site 35, site 20 is under site 31, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at site 35 (RM 5.7) is a fourth order stream located in Floyd County (Figure E.7). Its watershed consists of the Upper, Middle, and part of the Lower Right Fork Beaver Creek subwatersheds and extends from Knott into Floyd County. Information about Right Fork Beaver Creek at site 35, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.31. It has a catchment of 90,610 acres (142 square miles) with a 79% forested and 5.8 % developed land cover (Table E.32). There are several wildlife management areas and an elk release site in this subwatershed (Figure E.7). Portions of this watershed are sewered; especially in larger cities (see Figures 5.17 and 5.18). There are three stream water withdrawals in this subwatershed (Table E.33). Sampling data from site 35 is presented in Table E.34, and the TMDL allocations in Table E.35.

Table E.31 Right Fork Beaver Creek Site 35 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Right Fork Beaver Creek	Right Fork Beaver Creek 0.0 to 17.4	501863_01	Floyd	90610.36	141.579	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
35	35	5.7	37.52986	-82.79064	189.1	5.7	0.4355	1.4312	188.104

Table E.32 Right Fork Beaver Creek Site 35 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	75.30	0.12	0.08	
Developed	5288.83	8.26	5.84	1
Barren Land	1164.43	1.82	1.29	
Forest/Shrubland	71603.88	111.88	79.02	
Grassland/Herbaceous	9868.36	15.42	10.89	
Pasture/ Hay	2472.33	3.86	2.73	
Cultivated Crops	124.98	0.20	0.14	
Wetlands	12.25	0.02	0.01	
Totals	90610.36	141.58	100.00	

Table E.33 Right Fork Beaver Creek Site 35 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal, cfs	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.4100156	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.01547229	37.41038	-82.78096
3502	RM 4.2 of Caney Creek	ICG Knott Co LLC	1.005699	37.3884	-82.82856
		subtraction from MAF	1.43118689		



Table E.34 Right Fork Beaver Creek Site 35 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/07	140	N/A	N/A	N/A
05/30/07	190	27.832	129.38	1.43
06/13/07	340	N/A	N/A	N/A
06/27/07	3500	N/A	N/A	N/A
6/27/07 (QA Sample)	2400	N/A	N/A	N/A
07/10/07	50	N/A	N/A	N/A
07/26/07	6700	N/A	N/A	N/A
7/26/07 (QA Sample)	1100	N/A	N/A	N/A
08/17/07	170	6.893	28.67	0.32
08/31/07	70	N/A	N/A	N/A
09/14/07	310	N/A	N/A	N/A
09/28/07	640	N/A	N/A	N/A
10/12/07	310	2.925	22.18	0.24
11/17/07 (outside PCR season)	2600	N/A	N/A	N/A
Greatest Concentration	6700			

Table E.35 TMDLs for Right Fork Beaver Creek Site 35

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					30834.1757	Existing Load
					<b>1104.5078</b>	<b>Total TMDL</b>
					<b>110.4508</b>	<b>MOS</b>
					994.0570	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	96.78	% reduction
2527	KY0042854	KNOTT CO WATER & SEWER DIST	Sewerage System	0.154723	<b>0.9085</b>	<b>KPDES WLA</b>
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	School	0.010831	<b>0.0636</b>	<b>KPDES WLA</b>
35254	KY0079430	ALLEN CENTRAL HIGH SCHOOL	School	0.01702	<b>0.0999</b>	<b>KPDES WLA</b>
2517	KY0083089	GOLDEN YEARS REST HOME	Intermediate Care facility	0.015472	<b>0.0908</b>	<b>KPDES WLA</b>
35359	KY0087076	JONES FORK ELEM SCHOOL	School	0.009283	<b>0.0545</b>	<b>KPDES WLA</b>
35258	KY0093017	JAMES A DUFF ELEM SCHOOL	School	0.012378	<b>0.0727</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
2514	KY0094510	CONSOL OF KY INC JONES FORK	Bituminous Coal & Lig. Surface	0.004642	<b>0.0273</b>	<b>KPDES WLA</b>
35761	KY0105228	WAYLAND STP	Sewerage System	0.154723	<b>0.9085</b>	<b>KPDES WLA</b>
35260	KY0107051	EASTERN STP	Sewerage System	0.038681	<b>0.2271</b>	<b>KPDES WLA</b>
1196	KYG400590	GOBLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1199	KYG400603	GREEN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1270	KYG400666	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1222	KYG400730	HOOVER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1293	KYG400836	PERKINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1314	KYG400844	SHEPHERD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1243	KYG400915	KESTER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4327	KYG401073	MAY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4350	KYG401113	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4344	KYG401121	FRASURE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4336	KYG401125	CRUM RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
12253	KYG401218	SHEPPARD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15655	KYG401296	WEBB RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15807	KYG401352	EVERIDGE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
33378	KYG401353	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
74185	KYG401475	HALL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
43120	KYG401540	WALLACE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
43224	KYG401548	PRATER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
46147	KYG401603	CHILDERS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
50950	KYG401730	KIDD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
75556	KYG401857	HOWARD RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
76078	KYG401876	BILITER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
97291	KYG402063	PRATER RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>2.5574</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.435545	991.4996	remainder
					<b>9.9150</b>	<b>Future Growth WLA</b>
					<b>12.4724</b>	<b>Total WLA</b>
					<b>981.5846</b>	<b>LA</b>

### Frasure Creek Site 41

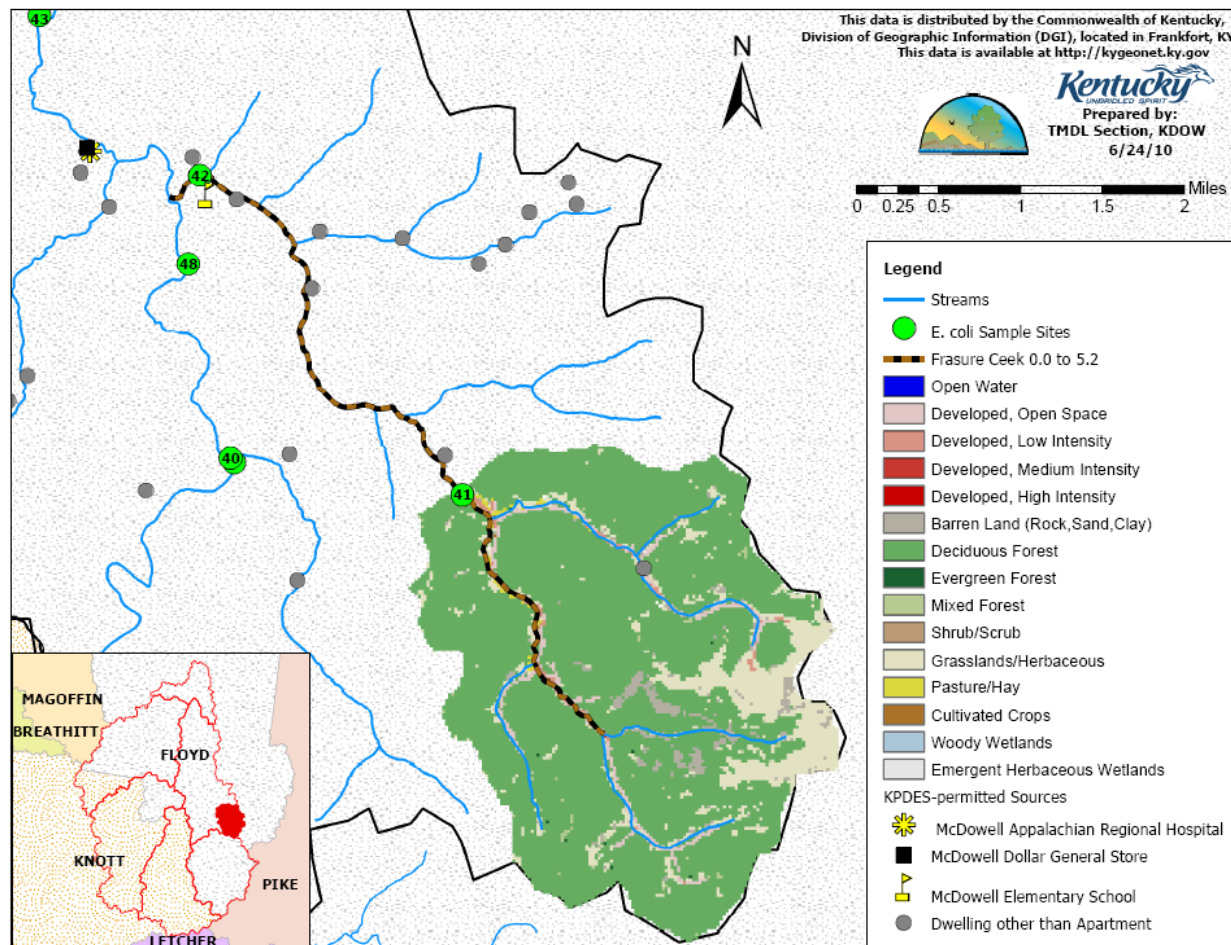


Figure E.8 Frasure Creek Site 41

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

Frasure Creek at site 41 (RM 3.25) is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure E.8). Information about Frasure Creek at site 41, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.36. It has a catchment of 3,494 acres (5.5 square miles) with an 82% forested and 3.2 % developed land cover (Table E.37). This watershed is un-sewered. There are no water withdrawals in this subwatershed. Sampling data from site 41 is presented in Table E.38, and the TMDL allocations in Table E.39.

Table E.36 Frasure Creek Site 41 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Frasure Creek	Frasure Creek 0.0 to 5.2	492466_01	Floyd	3494.33	5.46	3rd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
41	41	3.25	37.42650	-82.70880	7.6	3.25	0.00077	0	7.6008

Table E.37 Frasure Creek Site 41 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	119.59	0.19	3.42	0.5
Barren Land	93.09	0.15	2.66	
Forest/Shrubland	2853.19	4.46	81.65	
Grassland/Herbaceous	411.10	0.64	11.76	
Pasture/ Hay	16.70	0.03	0.48	
Cultivated Crops	0.67	0.00	0.02	
Wetlands	0.00	0.00	0.00	
Totals	3494.33	5.46	100.00	

Table E.38 Frasure Creek Site 41 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	2000	N/A	N/A	N/A
05/30/08	1600	0.9202	36.02	10.31
06/13/08	170	0.3155	1.31	0.38
06/27/08	450	0.29	3.19	0.91
07/31/08	71000	18.8592	32759.73	9375.11
08/08/08	1700	0.474	19.71	5.64
8/8/08 (QA Sample)	360	N/A	N/A	N/A
09/12/08	13000	0.7636	242.87	69.50
09/20/08	1000	0.391	9.57	2.74
Greatest Concentration	71000			

Table E.39 TMDLs for Frasure Creek Site 41

TMDL Table					<u>E. coli</u> (billion colonies/day)	
Site 41					13203.0671	Existing Load
					<b>44.6301</b>	<b>Total TMDL</b>
					<b>4.4630</b>	<b>MOS</b>
					40.1671	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.70	% reduction
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0007736	40.1625	remainder
					<b>0.2008</b>	<b>Future Growth WLA</b>
					<b>0.2053</b>	<b>Total WLA</b>
					<b>39.9617</b>	<b>LA</b>



### Frasure Creek Site 42

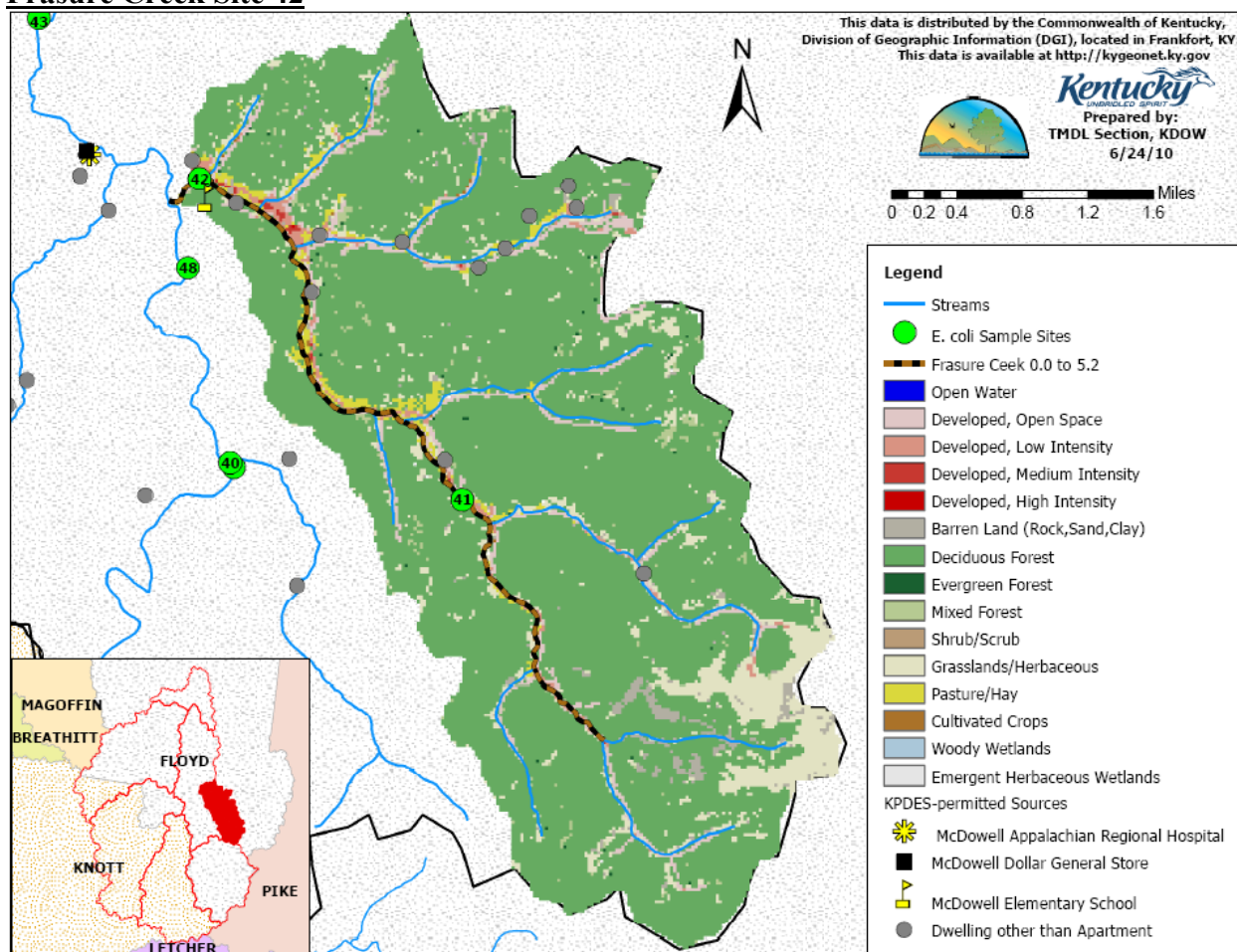


Figure E.9 Frasure Creek Site 42

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 47 is under site 40.

Frasure Creek at site 42 (RM 0.25) is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure E.9). Information about Frasure Creek at site 42, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.40. It has a catchment of 7,360 acres (11.5 square miles) with an 83% forested and 5.1 % developed land cover (Table E.41). This watershed is un-sewered. There are no water withdrawals in this subwatershed. Sampling data from site 42 is presented in Table E.42, and the TMDL allocations in Table E.43.

Table E.40 Frasure Creek Site 42 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order				
Frasure Creek	Frasure Creek 0.0 to 5.2	492466_01	Floyd	7360.17	11.5	3rd order				
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)	
42	42	0.25	37.45560	-82.73680	15.6	0	0.03249	0	15.6325	

Table E.41 Frasure Creek Site 42 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	376.21	0.59	5.11	1.0
Barren Land	115.46	0.18	1.57	
Forest/Shrubland	6099.62	9.53	82.87	
Grassland/Herbaceous	611.81	0.96	8.31	
Pasture/ Hay	151.51	0.24	2.06	
Cultivated Crops	5.56	0.01	0.08	
Wetlands	0.00	0.00	0.00	
Totals	7360.17	11.50	100.00	

Table E.42 Frasure Creek Site 42 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	160	N/A	N/A	N/A
05/30/08	400	1.3342	13.06	1.77
06/13/08	570	6.321	88.15	11.98
06/27/08	560	0.8631	11.83	1.61
07/31/08	43000	N/A	N/A	N/A
08/08/08	440	0.588	6.33	0.86
08/22/08	900	0.116	2.55	0.35
8/22/08 (QA Sample)	1100	N/A	N/A	N/A
09/12/08	3300	0.709	57.24	7.78
9/12/08 (QA Sample)	3600	N/A	N/A	N/A
09/20/08	1900	0.256	11.90	1.62
10/17/08	3200	0.476	37.27	5.06
10/24/08	760	0.211	3.92	0.53
Greatest Concentration	43000			

Table E.43 TMDLs for Frasure Creek Site 42

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					16445.8130	Existing Load
					<b>91.7906</b>	<b>Total TMDL</b>
					<b>9.1791</b>	<b>MOS</b>
					82.6115	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.50	% reduction
35252	KY0079421	MCDOWELL ELEM SCHOOL	School	0.0232084	<b>0.0045</b>	<b>KPDES WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.1363</b>	<b>KPDES WLA</b>
					<b>0.1908</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.0324918	82.4207	remainder
					<b>0.8242</b>	<b>Future Growth WLA</b>
					<b>1.0150</b>	<b>Total WLA</b>
					<b>81.5965</b>	<b>LA</b>

### Left Fork Beaver Creek Site 45

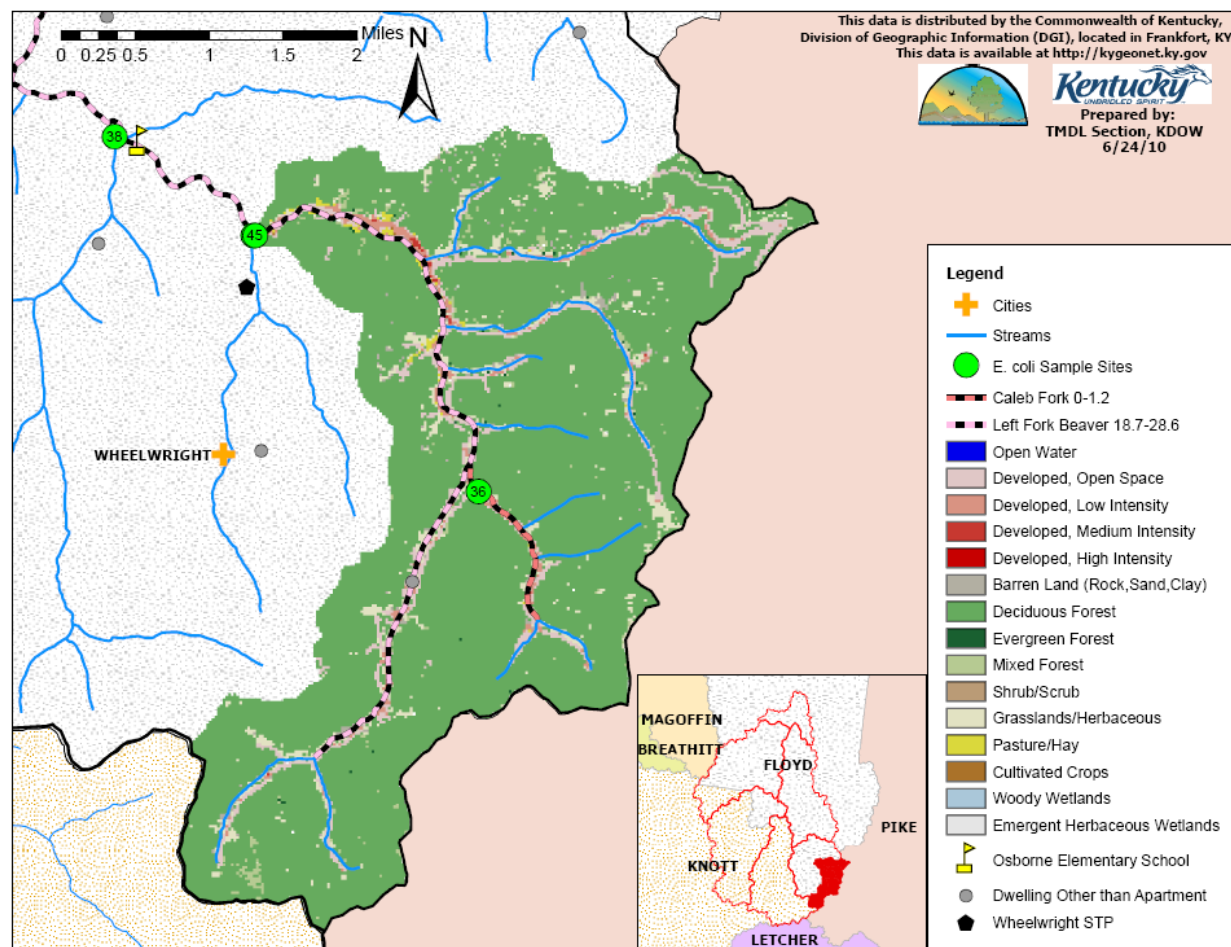


Figure E.10 Left Fork Beaver Creek Site 45

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45.

Left Fork Beaver Creek at site 45 (RM 23.4) is a fourth order stream located in the Upper Left Fork subwatershed in Floyd County (Figure E.10). Information about Left Fork Beaver Creek at site 45, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.44. It has a catchment of 7,019 acres (11 square miles) with an 87% forested and 6.9 % developed land cover (Table E.45). Portions of this watershed around the city of Wheelwright are sewered (see Figure 5.16). There are no water withdrawals in this subwatershed. Sampling data from site 45 is presented in Table E.46, and the TMDL allocations in Table E.47.

Table E.44 Left Fork Beaver Creek Site 45 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Left Fork Beaver Creek	Left Fork Beaver Creek 18.7 to 28.6	496194_04	Floyd	7019.46	10.97	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
45	45	23.4	37.35390	-82.71630	15.4	23.4	0.00077	0	15.4008

Table E.45 Left Fork Beaver Creek Site 45 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	0.00	0.00	0.00	
Developed	482.05	0.75	6.87	1
Barren Land	59.62	0.09	0.85	
Forest/Shrubland	6114.97	9.55	87.11	
Grassland/Herbaceous	332.34	0.52	4.73	
Pasture/Hay	29.36	0.05	0.42	
Cultivated Crops	0.89	0.00	0.01	
Wetlands	0.22	0.00	0.00	
Totals	7019.46	10.97	100.00	

Table E.46 Left Fork Beaver Creek Site 45 Data

Collection Date	<u>E. coli</u> (colonies/ 100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	3900	4.395	419.36	59.74
05/30/08	1400	21.576	739.02	105.28
06/13/08	2500	0.138	8.44	1.20
06/27/08	580	1.103	15.65	2.23
07/11/08	310	0.555	4.21	0.60
07/31/08	>80000	5.316	10404.80	1482.28
08/08/08	740	0.689	12.47	1.78
08/22/08	600	0.508	7.46	1.06
09/12/08	30000	0.520	381.67	54.37
09/20/08	2000	0.158	7.73	1.10
10/17/08	6800	0.958	159.38	22.71
10/24/08	860	0.433	9.11	1.30
10/24/08 (QA Sample)	390	N/A	N/A	N/A
Greatest Concentration	80000			

Table E.47 TMDLs for Left Fork Beaver Creek Site 45

TMDL Table					<u>E. coli</u> (billion colonies/day)	
Site 45					30143.3285	Existing Load
					<b>90.4300</b>	<b>Total TMDL</b>
					<b>9.0430</b>	<b>MOS</b>
					81.3870	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.73	% reduction
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.000773615	<b>0.0045</b>	<b>KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.000773615	81.3824	remainder
					<b>0.8138</b>	<b>Future Growth WLA</b>
					<b>0.8183</b>	<b>Total WLA</b>
					<b>80.5686</b>	<b>LA</b>



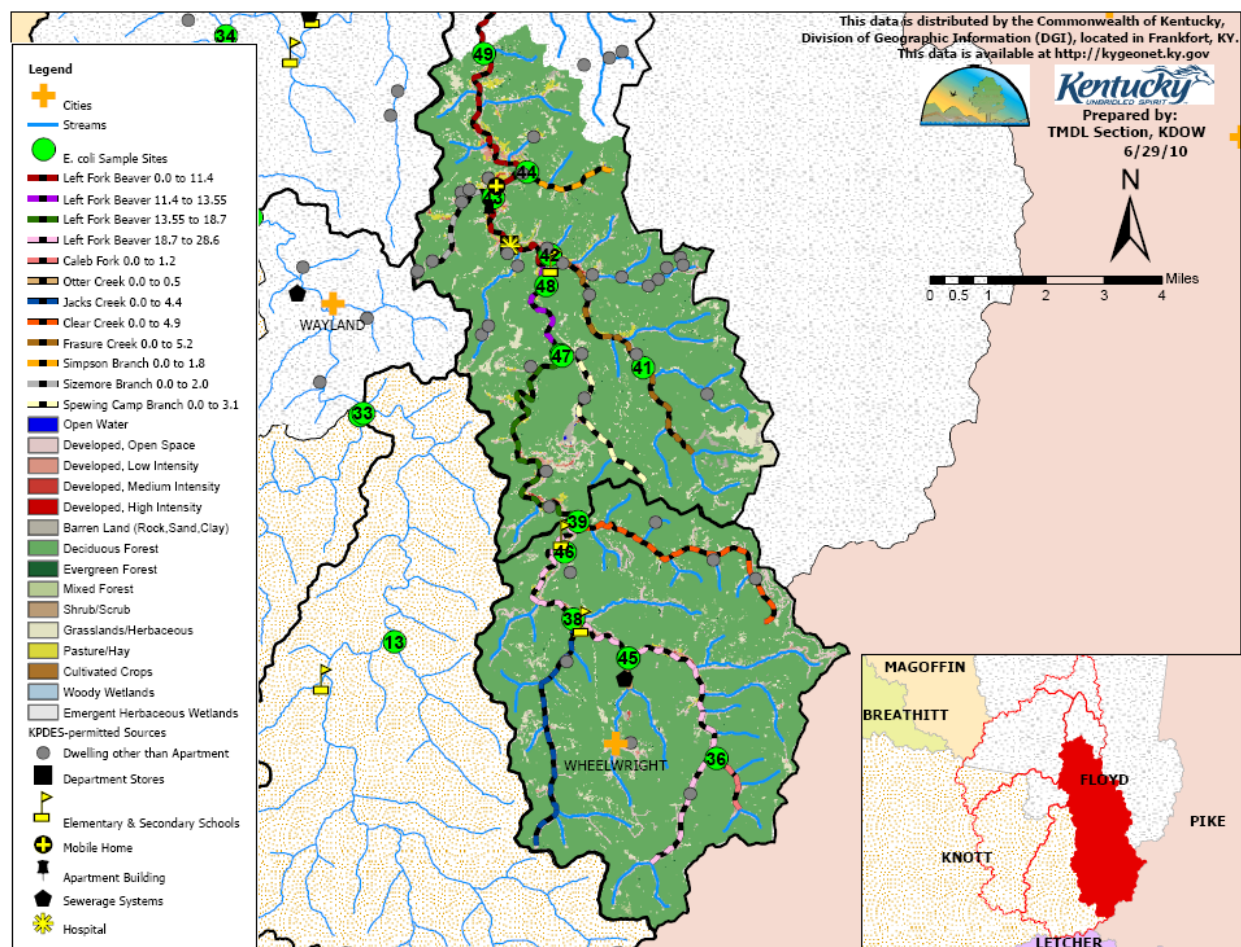
**Left Fork Beaver Creek Site 49**

Figure E.11 Left Fork Beaver Creek Site 49

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Left Fork Beaver Creek at site 49 (RM 5.6) is a fourth order stream located in Floyd County (Figure E.11). Its watershed consists of the Upper and part of the Lower Left Fork Beaver Creek subwatersheds. Information about Left Fork Beaver Creek at site 49, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.48. It has a catchment of 40,027 acres (62.5 square miles) with an 83% forested and 6.6 % developed land cover (Table E.49). Portions of this watershed around the city of Wheelwright are sewered (see Figure 5.16). There is one water withdrawal in this subwatershed (Table E.50). Sampling data from site 49 is presented in Table E.51, and the TMDL allocations in Table E.52.

Table E.48 Left Fork Beaver Creek Site 49 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Left Fork Beaver Creek	Left Fork Beaver Creek 0.0 to 11.4	496194_01	Floyd	40026.78	62.54	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
49	49	5.6	37.50640	-82.75550	84.5	5.6	0.50857	0.09283	84.9157

Table E.49 Left Fork Beaver Creek Site 49 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	4.46	0.01	0.01	
Developed	2648.50	4.14	6.62	1
Barren Land	408.58	0.64	1.02	
Forest/Shrubland	33389.72	52.17	83.42	
Grassland/ Herbaceous	2646.27	4.13	6.61	
Pasture/Hay	872.21	1.36	2.18	
Cultivated Crops	53.72	0.08	0.13	
Wetlands	3.34	0.01	0.01	
Totals	40026.78	62.54	100.00	

Table E.50 Left Fork Beaver Creek Site 49 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
		subtraction from MAF	0.09283372		

Table E.51 Left Fork Beaver Creek Site 49 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	170	N/A	N/A	N/A
05/30/08	30	11.975	8.79	0.22
5/30/08 (QA Sample)	20	N/A	N/A	N/A
06/13/08	60	7.4685	10.96	0.27
06/27/08	110	7.915	21.30	0.53
07/31/08	53000	37.108	48117.39	1202.13
08/08/08	70	8.333	14.27	0.36
08/22/08	<10	1.803	0.44	0.01
09/12/08	380	N/A	N/A	N/A
9/12/08 (QA Sample)	240	N/A	N/A	N/A
09/20/08	130	1.8648	5.93	0.15
10/17/08	100	3.999	9.78	0.24
10/24/08	170	3.356	13.96	0.35
Greatest Concentration	53000			

Table E.52 TMDLs for Left Fork Beaver Creek Site 49

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					110108.9835	Existing Load
					498.6067	Total TMDL
					49.8607	MOS
					448.7460	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.59	% reduction
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.3481265	2.0441	KPDES WLA
35252	KY0079421	MCDOWELL ELEM SCHOOL	School	0.0232084	0.1363	KPDES WLA
1134	KY0085791	MCDOWELL APPALACHIAN REG HOSP	Hospital	0.0309446	0.1817	KPDES WLA
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.0105212	0.0618	KPDES WLA
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.0232084	0.1363	KPDES WLA
1255	KY0096342	LEFT BEAVER CREEK TOWNHOUSES	Apartment Building	0.0278501	0.1635	KPDES WLA

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1263	KY0103136	MCDOWELL DOLLAR GENERAL STORE	Department Store	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1305	KY0103233	S & V MHP	Mobile Home Site	0.0153176	<b>0.0899</b>	<b>KPDES WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1143	KYG400479	BLACKBURN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1218	KYG400567	HICKS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1274	KYG400714	MULLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1369	KYG400724	YOUMANS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG400854	COLLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4333	KYG401140	DYE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
4332	KYG401142	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
15635	KYG401271	LAWSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74022	KYG401406	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74025	KYG401409	STUMBO RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74062	KYG401442	MULLINS II RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG401516	COLLINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45396	KYG401587	GEARHEART RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
45070	KYG401590	HALL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48864	KYG401645	DUFF RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.0007736	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>2.9862</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.5085742	445.7598	remainder
					<b>4.4576</b>	<b>Future Growth WLA</b>
					<b>7.4438</b>	<b>Total WLA</b>
					<b>441.3022</b>	<b>LA</b>



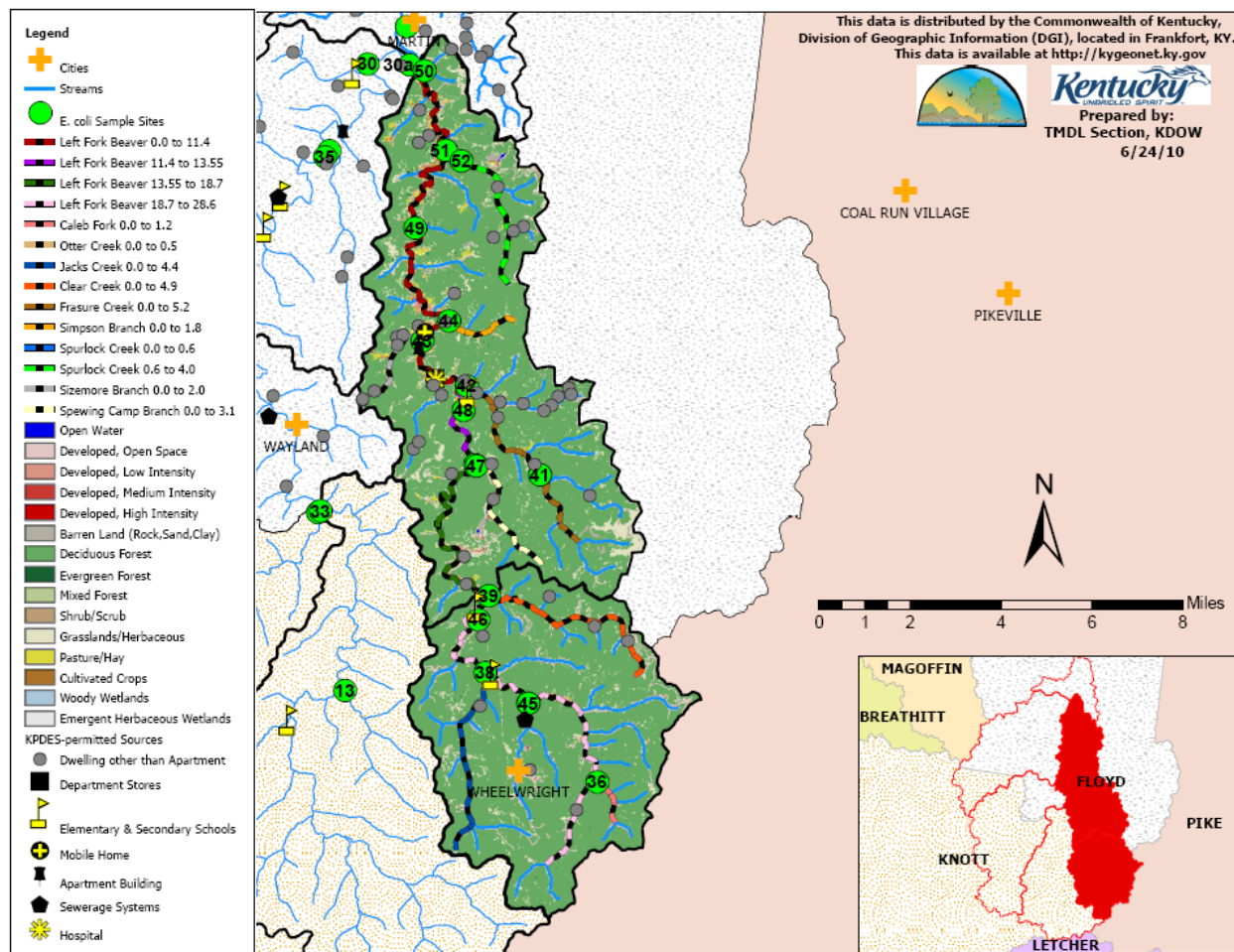
**Left Fork Beaver Creek Site 50**

Figure E.12 Left Fork Beaver Creek Site 50

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 27 is under site 35, site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Left Fork Beaver Creek at site 50 (RM 0.3) is a fourth order stream located in Floyd County (Figure E.12). Its watershed consists of the Upper and Lower Left Fork Beaver Creek subwatersheds. Information about Left Fork Beaver Creek at site 50, including sample site location, waterbody identification number (WBID), and MAF is shown in Table E.53. It has a catchment of 46,862 acres (73.2 square miles) with an 82% forested and 6.8 % developed land cover (Table E.54). Portions of this watershed around the city of Wheelwright are sewered (see Figure 5.16). There are two water withdrawals in this subwatershed (Table E.55). Sampling data from site 50 is presented in Table E.56, and the TMDL allocations in Table E.57.

Table E.53 Left Fork Beaver Creek Site 50 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Left Fork Beaver Creek	Left Fork Beaver Creek 0.0 to 11.4	496194_01	Floyd	46861.59	73.221	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
50	50	0.3	37.55640	-82.74970	98	0	0.51476	0.76124	97.7535

Table E.54 Left Fork Beaver Creek Site 50 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area	Future Growth WLA %
Open Water	12.46	0.02	0.03	
Developed	3207.43	5.01	6.84	1.0
Barren Land	483.82	0.76	1.03	
Forest/Shrubland	38659.82	60.41	82.50	
Grassland/Herbaceous	3224.34	5.04	6.88	
Pasture/Hay	1178.07	1.84	2.51	
Cultivated Crops	90.31	0.14	0.19	
Wetlands	5.34	0.01	0.01	
Totals	46861.59	73.22	100.00	

Table E.55 Left Fork Beaver Creek Site 50 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
78571	RM 2.4 of Left Fork Beaver Creek	Black Diamond Mining	0.6684028	37.53192	-82.74364
		subtraction from MAF	0.76123652		

Table E.56 Left Fork Beaver Creek Site 50 Data

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	390	N/A	N/A	N/A
05/30/08	600	N/A	N/A	N/A
06/13/08	220	N/A	N/A	N/A
6/13/08 (QA Sample)	190	N/A	N/A	N/A
06/27/08	70	N/A	N/A	N/A
07/11/08	390	12.956	123.62	2.64
07/31/08	27000	N/A	N/A	N/A
08/08/08	220	5.708	30.72	0.66
08/22/08	240	0.0144	0.08	0.00
09/12/08	16000	22.148	8669.88	185.01
09/20/08	170	3.596	14.96	0.32
10/17/08	180	3.155	13.89	0.30
10/24/08	10	3.413	0.84	0.02
<b>Greatest Concentration</b>	<b>27000</b>			

Table E.57 TMDLs for Left Fork Beaver Creek Site 50

TMDL Table					<u>E. coli</u> (billion colonies/day)	
					64573.5824	Existing Load
					<b>573.9874</b>	<b>Total TMDL</b>
					<b>57.3987</b>	<b>MOS</b>
					516.5887	TMDL Target
AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	99.20	% reduction
40534	KY0028789	WHEELWRIGHT STP	Sewerage System	0.348127	<b>2.0441</b>	<b>KPDES WLA</b>
35252	KY0079421	MCDOWELL ELEM SCHOOL	School	0.023208	<b>0.1363</b>	<b>KPDES WLA</b>
1134	KY0085791	MCDOWELL APPALACHIAN REG HOSP	Hospital	0.030945	<b>0.1817</b>	<b>KPDES WLA</b>
35251	KY0089435	OSBORNE ELEM SCHOOL	School	0.010521	<b>0.0618</b>	<b>KPDES WLA</b>
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	School	0.023208	<b>0.1363</b>	<b>KPDES WLA</b>
1255	KY0096342	LEFT BEAVER CREEK TOWNHOUSES	Apartment Building	0.02785	<b>0.1635</b>	<b>KPDES WLA</b>
1263	KY0103136	MCDOWELL DOLLAR GENERAL STORE	Department Store	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1305	KY0103233	S & V MHP	Mobile Home Site	0.015318	<b>0.0899</b>	<b>KPDES WLA</b>
1269	KYG400478	MITCHELL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1143	KYG400479	BLACKBURN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1218	KYG400567	HICKS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1367	KYG400579	WRIGHT RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1327	KYG400601	STUMBO RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1182	KYG400614	DYE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4250	KYG400659	CURRENT RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1315	KYG400677	SHREWBERRY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1162	KYG400678	CASTLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1161	KYG400692	CASE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1274	KYG400714	MULLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1369	KYG400724	YOUMANS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1237	KYG400753	BINGHAM RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1173	KYG400790	COOK RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG400854	COLLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1202	KYG400969	HALL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
1266	KYG400970	MEADE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4356	KYG401040	HOWELL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4349	KYG401133	JONES RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4333	KYG401140	DYE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4332	KYG401142	TACKETT RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
4405	KYG401197	BARTLEY RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
15635	KYG401271	LAWSON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74022	KYG401406	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74025	KYG401409	STUMBO RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74062	KYG401442	MULLINS II RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74181	KYG401470	TACKETT RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
1168	KYG401516	COLLINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
35887	KYG401533	MOORE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
44695	KYG401580	CAUDILL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
45073	KYG401582	DINGUS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
45396	KYG401587	GEARHEART RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
45070	KYG401590	HALL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>

AI number	KPDES #	Discharger Facility Name	Type	Design Capacity (cfs)	<u>E. coli</u> (billion colonies/day)	-----
46144	KYG401601	WILLIAMSON RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
48864	KYG401645	DUFF RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
48897	KYG401646	COCHRAN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
49354	KYG401654	YORK RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
50021	KYG401692	BLANKENSHIP RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
71436	KYG401809	NEWMAN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
74243	KYG401821	COMBS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
75141	KYG401851	LITTLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
79525	KYG401931	HARVEL RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
81193	KYG401970	MARTIN RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
82471	KYG402002	HOPKINS RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
103052	KYG402117	LITTLE RESIDENCE	Dwelling Other than Apartment	0.000774	<b>0.0045</b>	<b>KPDES WLA</b>
					<b>3.0226</b>	<b>Total KPDES WLA</b>
			Addition to MAF (sum of cfs)	0.514763	513.5661	remainder
					<b>5.1357</b>	<b>Future Growth WLA</b>
					<b>8.1582</b>	<b>Total WLA</b>
					<b>508.4304</b>	<b>LA</b>



## Appendix F. Information for Fully Supporting Segments

### Rock Fork RM 0.0 to 7.0

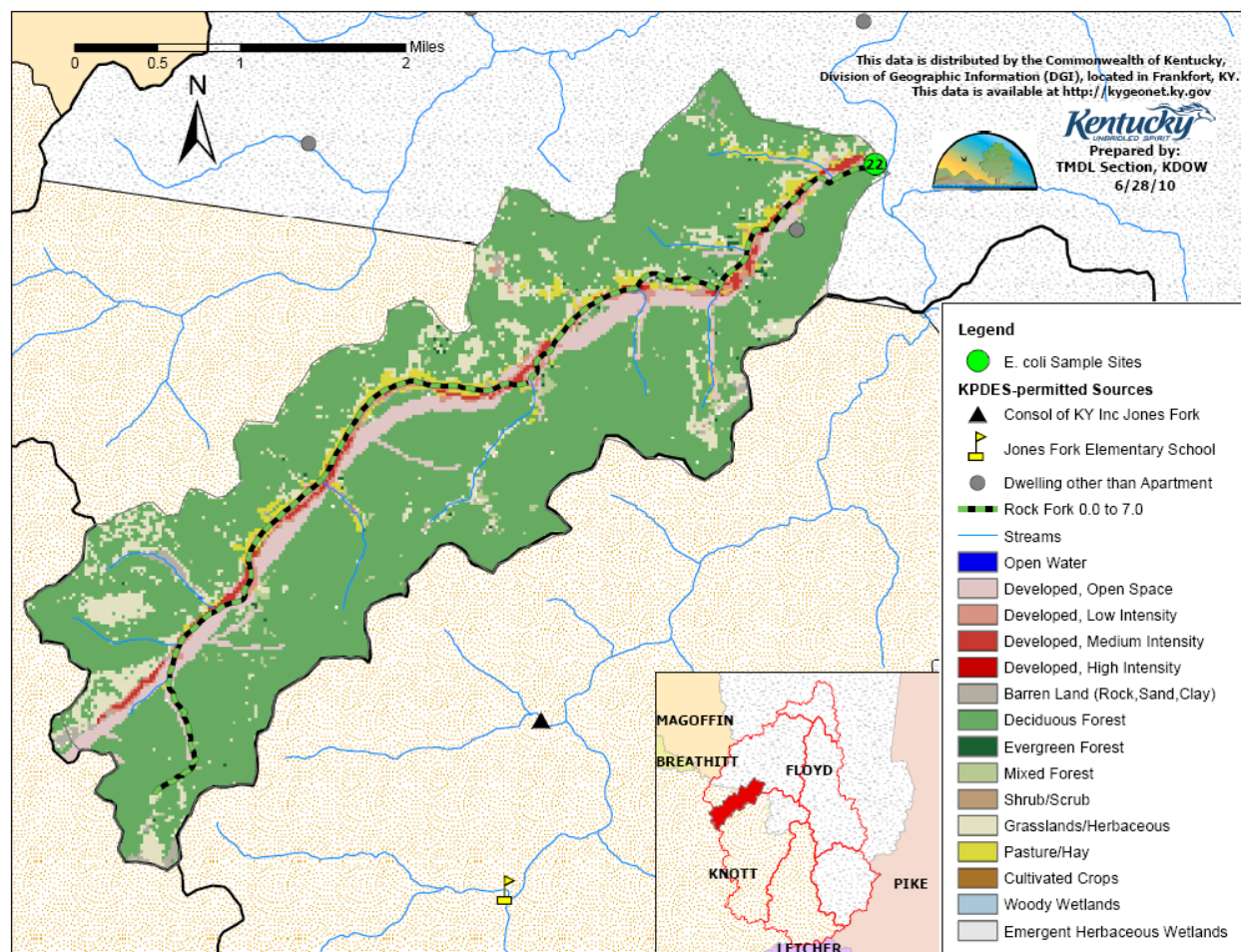


Figure F.1 Rock Fork RM 0.0 to 7.0

Rock Fork is a second order stream located in the Lower Right Fork Beaver Creek subwatershed in Floyd County (Figure F.1). Information about Rock Fork, including sample site location, waterbody identification number (WBID), and MAF is shown in Table F.1. It has a catchment of 5,333 acres (8.3 square miles) with a 77% forested and 10.2% developed land cover (Table F.2). This subwatershed is un-sewered. There are no stream water withdrawals in this subwatershed. Sampling data from site 22 is presented in Table F.3 and KPDES-permitted sources of pathogen indicators are shown in Table F.4. Because this is a fully supporting segment, TMDLs are not calculated.

Table F.1 Rock Fork RM 0.0 to 7.0 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Rock Fork	Rock Fork 0.0 to 7.0	502115_01	Floyd	5333.35	8.333	2nd order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
22	22	0.1	37.48001	-82.83621	11.1	0	0.00077	0.000	11.1077

Table F.2 Rock Fork RM 0.0 to 7.0 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area
Open Water	0.22	0.00	0.00
Developed	542.96	0.85	10.18
Barren Land	67.81	0.11	1.27
Forest/Shrubland	4082.22	6.38	76.54
Grassland/Herbaceous	466.92	0.73	8.75
Pasture/ Hay	163.64	0.26	3.07
Cultivated Crops	9.12	0.01	0.17
Wetlands	0.44	0.00	0.01
Totals	5333.35	8.33	100.00

Table F.3 Rock Fork RM 0.0 to 7.0 Data (site 22)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/07	160	5.226	20.46	3.84
05/30/07	70	2.975	5.09	0.96
06/13/07	50	2.315	2.83	0.53
06/27/07	1600	2.025	79.27	14.86
07/10/07	80	1.705	3.34	0.63
07/26/07	1900	1.887	87.72	16.45
08/17/07	60	1.485	2.18	0.41
08/31/07	60	N/A	N/A	
09/14/07	200	1.924	9.41	1.77
09/28/07	110	0.955	2.57	0.48
10/12/07	100	1.023	2.50	0.47
10/12/07 (QA Sample)	90	N/A	N/A	N/A
11/16/07 (outside PCR season)	600	1.597	23.44	4.40

Table F.4 Rock Fork RM 0.0 to 7.0 Sources

AI number	KPDES #	Discharger Facility Name	Design Capacity (cfs)	Sic Code	Facility Latitude	Facility Longitude
15655	KYG401296	WEBB RESIDENCE	0.0007736	Dwelling Other than Apartment	37.474444	-82.845
		addition to MAF	0.0007736			

### Right Fork Beaver Creek RM 23.3 to 30.3

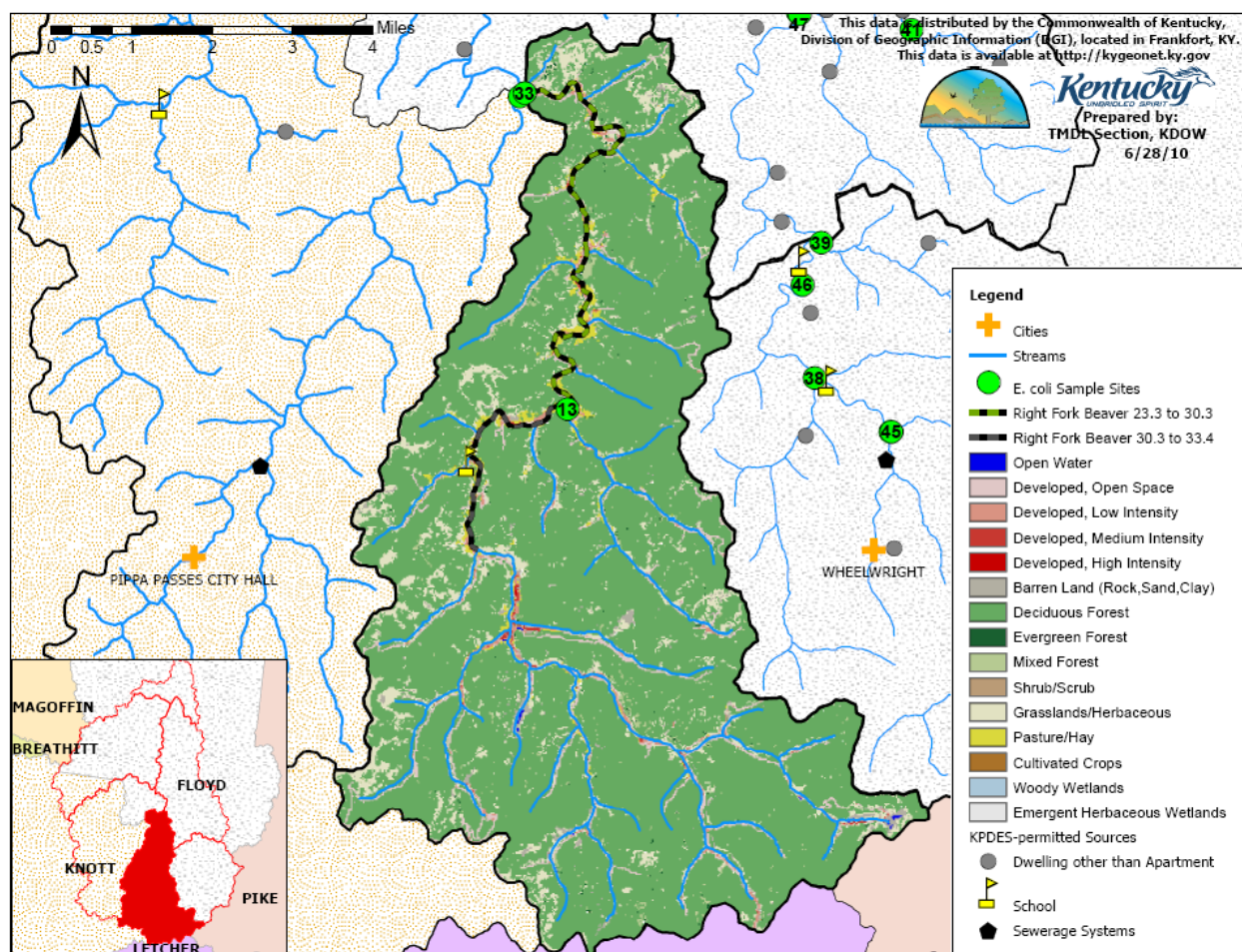


Figure F.2 Right Fork Beaver Creek RM 23.3 to 30.3

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Right Fork Beaver Creek at RM 23.3 is a fourth order stream located in the Upper Right Fork Beaver Creek subwatershed in Knott County (Figure F.2). Information about Right Fork Beaver Creek RM 23.3 to 30.3, including sample site location, waterbody identification number (WBID), and MAF is shown in Table F.5. It has a catchment of 27,178 acres (42.5 square miles) with an 83% forested and 5.3% developed land cover (Table F.6). This subwatershed is unsewered. There are two stream water withdrawals in this subwatershed (Table F.7). Sampling data from site 33 is presented in Table F.8 and KPDES-permitted sources of pathogen indicators are shown in Table F.9. Because this is a fully supporting segment, TMDLs are not calculated.



Table F.5 Right Fork Beaver Creek RM 23.3 to 30.3 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Right Fork Beaver Creek	Right Fork Beaver Creek 23.3 to 30.3	501863_03	Knott	27178.24	42.466	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
33	33	23.4	37.4173	-82.79682	58	23.3	0.01083	0.425488	57.5853

Table F.6 Right Fork Beaver Creek RM 23.3 to 30.3 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area
Open Water	11.56	0.02	0.04
Developed	1436.18	2.24	5.28
Barren Land	333.14	0.52	1.23
Forest/Shrubland	22586.82	35.29	83.11
Grassland/Herbaceous	2358.65	3.69	8.68
Pasture/ Hay	436.55	0.68	1.61
Cultivated Crops	14.46	0.02	0.05
Wetlands	0.89	0.00	0.00
Totals	27178.24	42.47	100.00

Table F.7 Right Fork Beaver Creek RM 23.3 to 30.3 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
2528	RM 40.6 Right Fork Beaver Creek	ICG Knott Co LLC (860-8012)	0.410016	37.32166	-82.80366
2525	RM 31.0 Right Fork Beaver Creek	Deane Mining LLC (860-5318)	0.015472	37.41038	-82.78096
		subtraction from MAF	0.425488		

Table F.8 Right Fork Beaver Creek RM 23.3 to 30.3 Data (Site 33)

Collection Date	<u>E. coli</u> (colonies/ 100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/15/07	150	431.7758	1584.56	58.30
05/30/07	<10	11.65	2.85	0.10
06/13/07	120	5.073	14.89	0.55
06/27/07	330	4.539	36.65	1.35
07/10/07	150	2.844	10.44	0.38
07/26/07	2500	20.381	1246.59	45.87
08/17/07	100	2.148	5.26	0.19
08/31/07	150	N/A	N/A	N/A
09/14/07	180	2.088	9.20	0.34
09/28/07	10	N/A	N/A	N/A
10/12/07	20	N/A	N/A	N/A
11/16/07 (outside PCR season)	290	2.4992	17.73	0.65
11/16/07 (QA Sample)	470	2.4992	N/A	N/A

Table F.9 Right Fork Beaver Creek RM 23.3 to 30.3 Sources

AI number	KPDES #	Discharger Facility Name	Design Capacity (cfs)	Sic Code	Facility Latitude	Facility Longitude
33945	KY0077542	BEAVER CREEK ELEM SCHOOL	0.0108306	School	37.351111	-82.812222
		addition to MAF	0.0108306			



### Left Fork Beaver Creek RM 13.55 to 18.7

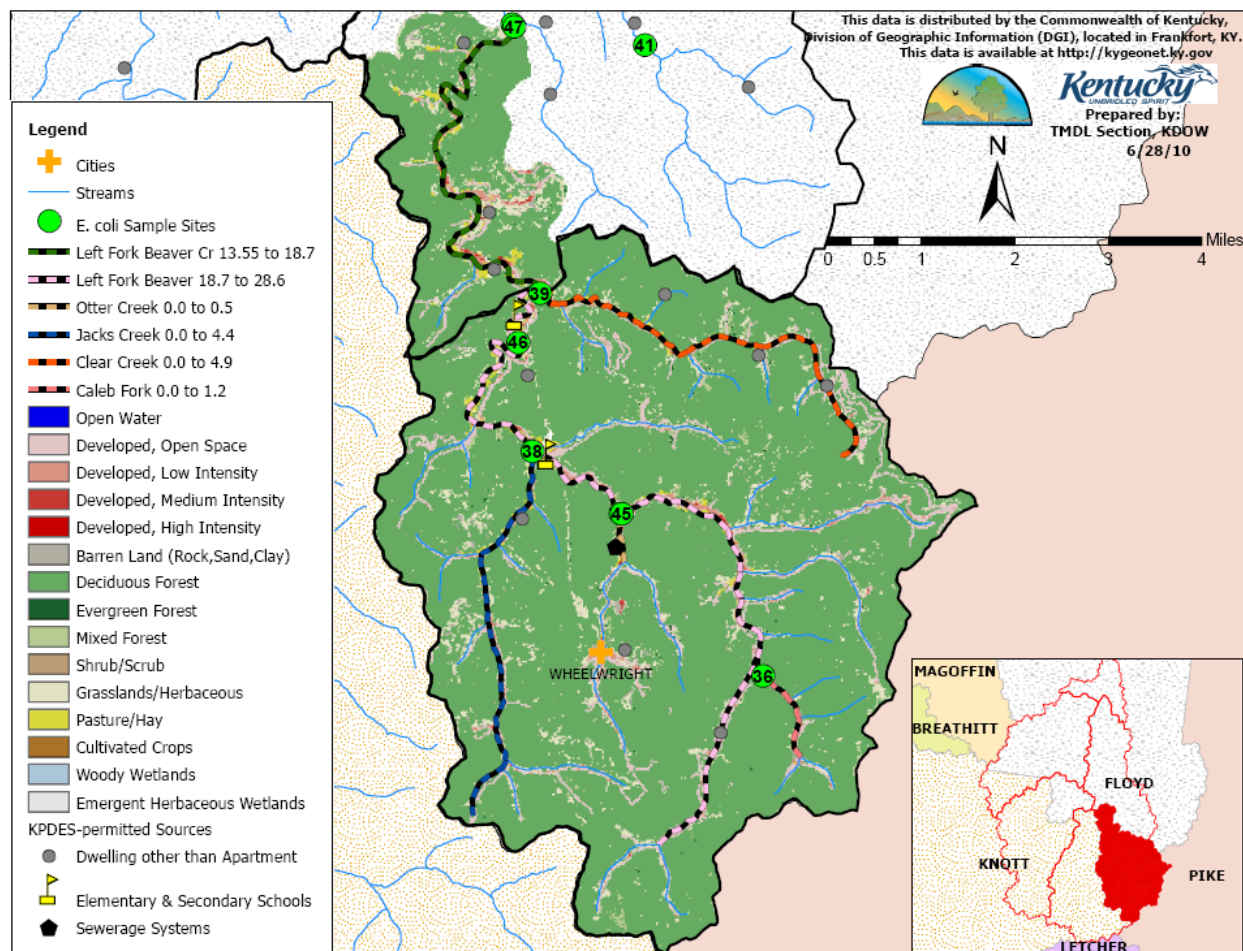


Figure F.3 Left Fork Beaver Creek RM 13.55 to 18.7

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 37 is under site 45, and site 40 is under site 47.

Left Fork Beaver Creek at RM 13.55 is a fourth order stream located in the Upper Left Fork Beaver Creek subwatershed in Floyd County (Figure F.3). Information about Left Fork Beaver Creek RM 13.55 to 18.7, including sample site location, waterbody identification number (WBID), and MAF is shown in Table F.10. It has a catchment of 22,569 acres (35.3 square miles) with an 85% forested and 7% developed land cover (Table F.11). This subwatershed is sewered around the city of Wheelwright (Figure F.4). There is one stream water withdrawal in this subwatershed (Table F.12). Sampling data from site 33 is presented in Table F.13 and KPDES-permitted sources of pathogen indicators are shown in Table F.14. Because this is a fully supporting segment, TMDLs are not calculated.

Table F.10 Left Fork Beaver Creek RM 13.55 to 18.7 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order			
Left Fork Beaver Creek	Left Fork Beaver Creek 13.55 to 18.7	496194_03	Floyd	22568.84	35.264	4th order			
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)
47	47	13.55	37.42999	-82.73404	48.4	13.55	0.38959	0.09283	48.69676

Table F.11 Left Fork Beaver Creek RM 13.55 to 18.7 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area
Open Water	0.00	0.00	0.00
Developed	1572.82	2.46	6.97
Barren Land	205.39	0.32	0.91
Forest/Shrubland	19203.80	30.01	85.09
Grassland/Herbaceous	1277.08	2.00	5.66
Pasture/ Hay	282.39	0.44	1.25
Cultivated Crops	25.81	0.04	0.11
Wetlands	1.56	0.00	0.01
Totals	22568.84	35.26	100.00

Table F.12 Left Fork Beaver Creek RM 13.55 to 18.7 Water Withdrawals

AI number	Source Description	Withdrawal Facility Name	Withdrawal (cfs)	Facility Latitude	Facility Longitude
1299	RM 15.36 of Left Fork Beaver Creek	Elk Horn Coal Co LLC	0.09283372	37.40129	-82.74175
		subtraction from MAF	0.09283372		

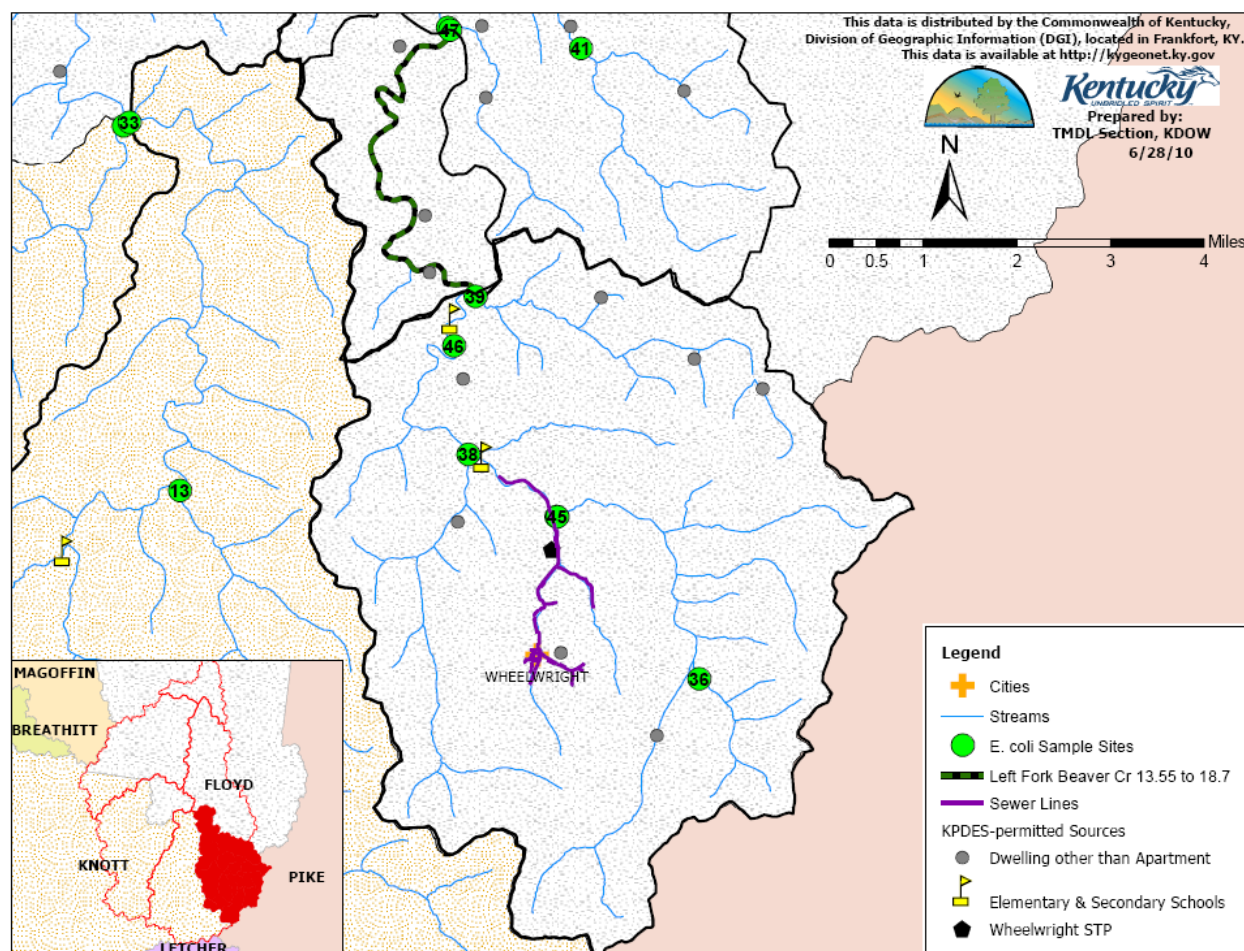


Figure F.4 Left Fork Beaver Creek RM 13.55 to 18.7 Sewer Lines

Note: Due to map resolution, some sites are masked by symbols for other sites. Site 32 is under site 33, site 37 is under site 45, and site 40 is under site 47.

Table F.13 Left Fork Beaver Creek RM 13.55 to 18.7 Data (site 47)

Collection Date	<i>E. coli</i> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <i>E. coli</i> colonies/day)	Unit Area Load (million <i>E. coli</i> colonies/day/acre)
05/16/08	90	N/A	N/A	N/A
05/30/08	300	7.0056	51.42	2.28
06/13/08	40	4.5576	4.46	0.20
06/27/08	40	2.8755	2.81	0.12
07/11/08	10	4.733	1.16	0.05
07/31/08	7500	26.059	4781.65	211.87
08/08/08	210	0.032	0.16	0.01
8/8/08 (QA Sample)	250	N/A	N/A	N/A
08/22/08	100	2.025	4.95	0.22
09/12/08	230	6.1594	34.66	1.54
09/20/08	30	3.2045	2.35	0.10
10/17/08	130	2.695	8.57	0.38
10/24/08	110	1.4958	4.03	0.18

Table F.14 Left Fork Beaver Creek RM 13.55 to 18.7 Sources

AI number	KPDES #	Discharger Facility Name	Design Capacity (cfs)	Type	Facility Latitude	Facility Longitude
40534	KY0028789	WHEEL-WRIGHT STP	0.3481265	Sewerage System	37.348888	-82.7175
35251	KY0089435	OSBORNE ELEM SCHOOL	0.0105212	School	37.363611	-82.73028
35260	KY0093912	SOUTH FLOYD HIGH SCHOOL	0.0232084 4	School	37.385298	-82.73556
1274	KYG400714	MULLINS RESIDENCE	0.0007736	Dwelling other than Apartment	37.427777	-82.74389
1237	KYG400753	BINGHAM RESIDENCE	0.0007736	Dwelling other than Apartment	37.387777	-82.70639
1173	KYG400790	COOK RESIDENCE	0.0007736	Dwelling other than Apartment	37.377777	-82.68861
1266	KYG400970	MEADE RESIDENCE	0.0007736	Dwelling other than Apartment	37.372777	-82.67556
4349	KYG401133	JONES RESIDENCE	0.0007736	Dwelling other than Apartment	37.353611	-82.73556
4333	KYG401140	DYE RESIDENCE	0.0007736	Dwelling other than Apartment	37.401388	-82.74
74062	KYG401442	MULLINS II RESIDENCE	0.0007736	Dwelling other than Apartment	37.3925	-82.73944
74181	KYG401470	TACKETT RESIDENCE	0.0007736	Dwelling other than Apartment	37.319444	-82.69833
44695	KYG401580	CAUDILL RESIDENCE	0.0007736	Dwelling other than Apartment	37.332777	-82.71639
48897	KYG401646	COCHRAN RESIDENCE	0.0007736	Dwelling other than Apartment	37.375833	-82.73361
		addition to MAF	0.3895923			



### Spurlock Creek RM 0.6 to 4.0

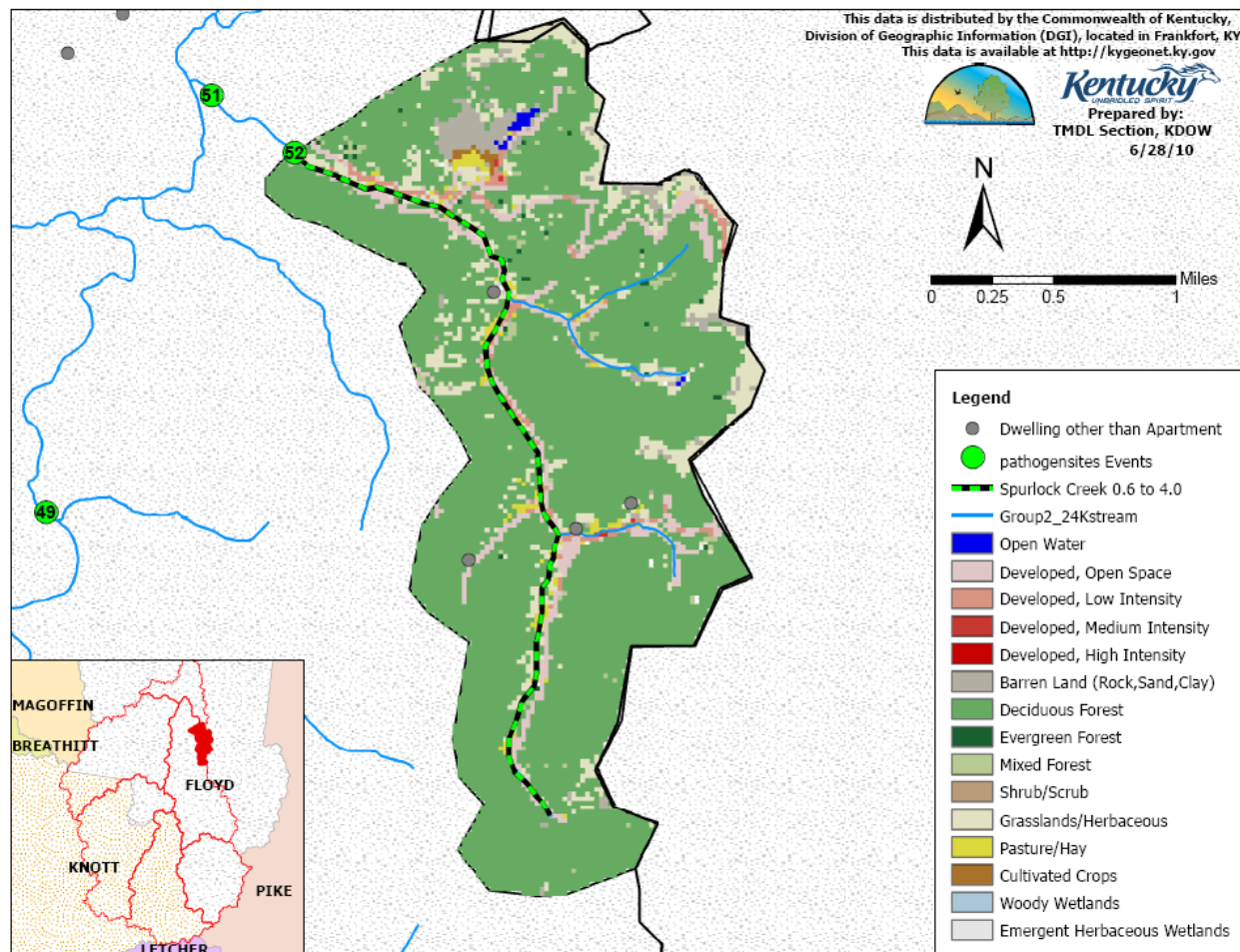


Figure F.5 Spurlock Creek RM 0.6 to 4.0

Spurlock Creek at RM 0.6 is a third order stream located in the Lower Left Fork Beaver Creek subwatershed in Floyd County (Figure F.5). Information about Spurlock Creek RM 0.6 to 4.0, including sample site location, waterbody identification number (WBID), and MAF is shown in Table F.15. It has a catchment of 2,358 acres (3.7 square miles) with a 78% forested and 7.4% developed land cover (Table F.16). This subwatershed is un-sewerd. There are no stream water withdrawals in this subwatershed. Sampling data from site 52 is presented in Table F.17 and KPDES-permitted sources of pathogen indicators are shown in Table F.18. Because this is a fully supporting segment, TMDLs are not calculated.

Table F.15 Spurlock Creek RM 0.6 to 4.0 Information

Stream	Stream Segment	WBID #	County	Acres	Square Miles	Stream Order				
Spurlock Creek	Spurlock Creek 0.6 to 4.0	504191_02	Floyd	2357.79	3.68	3rd order				
EKU Site #	MAP Site #	Sample Point RM	Sample Site Latitude	Sample Site Longitude	MAF (cfs)	RM of MAF Determination	+ to MAF (cfs)	- from MAF (cfs)	Adjusted MAF (cfs)	
52	52	0.6	37.527254	-82.73617	5	0.6	0.00309	0	5.00309	

Table F.16 Spurlock Creek RM 0.6 to 4.0 Subwatershed Land Cover

Land Cover	Watershed Acres	Watershed Square Miles	% of Total Area
Open Water	5.16	0.01	0.22
Developed	175.07	0.27	7.43
Barren Land	67.47	0.11	2.86
Forest/Shrubland	1848.93	2.89	78.42
Grassland/Herbaceous	220.13	0.34	9.34
Pasture/Hay	35.87	0.06	1.52
Cultivated Crops	4.71	0.01	0.20
Wetlands	0.45	0.00	0.02
Totals	2357.79	3.68	100.00

Table F.17 Spurlock Creek RM 0.6 to 4.0 Data (site 52)

Collection Date	<u>E. coli</u> (colonies/100 mls)	Flow (cfs)	Instantaneous Load (billion <u>E. coli</u> colonies/day)	Unit Area Load (million <u>E. coli</u> colonies/day/acre)
05/16/08	10	2.113	0.52	0.22
05/30/08	110	0.498	1.34	0.58
06/13/08	30	0.538	0.39	0.17
06/27/08	20	0.721	0.35	0.15
07/11/08	110	0.832	2.24	0.96
07/31/08	>80000	13.349	26127.47	11249.59
08/08/08	60	0.1285	0.19	0.08
8/8/08 (QA Sample)	40	N/A	N/A	N/A
08/22/08	<10	0.072	0.02	0.01
09/12/08	70	0.801	1.37	0.59
09/20/08	20	0.601	0.29	0.13
10/17/08	30	0.633	0.46	0.20
10/24/08	<10	0.505	0.12	0.05



Table F.18 Spurlock Creek RM 0.6 to 4.0 Sources

AI number	KPDES #	Discharger Facility Name	Design Capacity (cfs)	Type	Facility Latitude	Facility Longitude
1315	KYG400677	SHREWBERRY RESIDENCE	0.0007736	Dwelling other than Apartment	37.504444	-82.71611
1162	KYG400678	CASTLE RESIDENCE	0.0007736	Dwelling other than Apartment	37.518611	-82.72167
1161	KYG400692	CASE RESIDENCE	0.0007736	Dwelling other than Apartment	37.505833	-82.71194
46144	KYG401601	WILLIAMSON RESIDENCE	0.0007736	Dwelling other than Apartment	37.502777	-82.72417
		addition to MAF	0.0030945			